The IRON AGE

March 27, 1958 A Chilton Publication The National Metalworking Weekly

Special Area Development Feature P. 121

How to Solve the Puzzle Of New Plant Location

1. Choosing a Plant Site
2. How the Government Can Help
3. Plant Location Guide

Why We're Losing Friends in Canada – P. 65

3-D Drawings Get Ideas Across Faster – P. 93

Digest of the Week P. 2-3

ARISTOLOY

Controlled Quality

GEAR STEEL

Gears are a special steel problem. Controlled grain size, freedom from porosity, segregation, and non-metallic inclusions are essential. Chemistry is critical.

For these reasons, gear manufacturers insist upon electric furnace steels. Aristoloy, produced by the electric furnace method under stringent controls, from raw materials to melting, meets these requirements.

Aristoloy billets and bars in a wide range of A.I.S.I. analyses are available in carburizing and through-hardening grades. For assistance in selecting the best material for your job, call or write. A Copperweld Field Metallurgist will be glad to work with you.

New Leaded Steel Catalog now available. Write for your copy today.

ARISTOLOY STEELS

COPPERWELD STEEL COMPANY

Steel Division

4001 Mahoning Avenue • Warren, Ohio

Export: Copperweld Steel International Co., 225 Broadway, New York 7, N.Y.

XXVII

This is the twenty-seventh of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Cold-Finishing of Alloy Steels: The Effect of Cold-Drawing

The cold-drawing of alloy bars was discussed in the advertisement prior to this one, No. XXVI in the series. Here, we continue with a general explanation of the effect of cold-drawing.

During the cold-drawing process, certain changes take place in the steel structure, and in mechanical properties. There is a slight increase in tensile strength, compared with a substantial increase in yield point, and a decrease in ductility. These properties enable the production of small parts which require the greater strength necessary for certain automatic-machine forming operations, and a machine finish superior to hot-rolled material. Naturally, the beneficial effects of alloy steels are attained in the subsequent heat-treatment of parts.

The process of cold-drawing results in bars which are free from scale, accurate to shape, and within close tolerances. These conditions are ideal for automatic machining, as the elimination of scale is conducive to long tool life, and the accuracy of shape and close tolerances permit the bars to pass freely through the feed mechanism of the "automatic." Moreover, the cold-drawn finish and tolerances may be such that machining can be eliminated in some areas of the finished part. For example, sparkplug shells are produced from hexagon bars which require no machining on the hexagon sections.

Continuous roller hearths and car-bottom furnaces of both standard and controlled-atmosphere types, are used for special treatment of alloy bars before cold-drawing. Thermal stress-relieving can be used to reduce residual stresses in the steel caused by the cold-drawing process, wherein the mechanical properties will be altered depending upon the temperature used.

If you would like more specific details about the chemical composition or mechanical properties of cold-drawn alloy bars, and the results that can be expected, by all means consult our technical staff. Bethlehem metallurgists will gladly help you work out any problem, without cost or obligation on your part.

In the next advertisement, No. XXVIII in this series, the second category in cold-finishing will be discussed, i. e., the turning and grinding of alloy steel bars.

Remember that Bethlehem produces a wide and complete range of cold-drawn alloy steel bars in rounds, hexagons, squares, or flats, in standard, odd, decimal or metric sizes required, as well as special sections. Bethlehem also makes the full range of AISI standard alloy steels, and special-analysis steels and all carbon grades.

If you would like reprints of this series of advertisements from No. I to No. XXVII, please write to us, addressing your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa. The first 27 subjects in the series are now available in a handy 40-page booklet, and we shall be glad to send you a free copy.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

THE IRON AGE
Chestnut and 56th Sts.
Philadelphia 39, Pa.
SHerwood 8-2000

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The IRON AGE

March 27, 1958—Vol. 181, No. 13

Digest of the Week in

★Starred items are digested at right.

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STRAIN IS SHOWING

We're Losing Friends in Canada —It's sad but true that our relations

with Canada are deteriorating. It's time to salve some of the sore spots and shore up old friendships. P. 65

MINIATURIZATION

An Award for Ordnance — The first annual miniaturization award has gone to the U. S. Army Ordnance Corps. They won it for a transistor unit small enough to fit on a fingertip. Assembly illustrates use of photolithographic and printing techniques in miniaturizing. P. 68

STEEL'S '57 EARNINGS

Figures Can Be Misleading — Overall, the earnings of steel firms last year were up. Still, 21 of 29 companies made less than in '56. Higher prices offset letdown in sales and shipments. P. 72

REPORT TO MANAGEMENT

Confidence Dwindles — Authoritative survey of consumer status reveals lower income, pessimistic

Metalworking

PLANT LOCATION: Picking the best spot to locate a new plant is no simple job. Each region, state, and community should be carefully considered. In this issue, a special survey report will start you off on the right path. P. 121

predictions of what's ahead. But spending plans remain relatively intact and savings high. P. 77

CHRYSLER PLANT SHIFTS

Bring Union Questions — The UAW is likely to make an issue of the coming mass relocation of Chrysler operations. Union wants company to pay moving costs of workers transferring and severance pay for those not able to switch. P. 78

FEATURE ARTICLES

COMPLEX DRAWINGS

3-D Makes Them Clear—With a shortage of both draftsmen and trained blueprint readers, three-dimensional drawings offer a promising answer. By showing the three main faces of an object, a 3-D drawing replaces the three separate views of the conventional technique. Even non-technical personnel can understand them and they're quick and easy to make. P. 93

TITANIUM EXTRUSIONS

Cut Production Costs—One way to drastically cut the cost of titanium parts is to stop wasting titanium. Extrusion techniques plus the use of cast titanium ingots provide a two-way cost reduction program for parts of top quality. P. 96

VACUUM METALIZING

Uses Broaden—Vacuum metalizing is emerging as a full-blown finishing method that's functional as well as decorative. It turns out to be a low-cost finish for automotive parts. It's a simple production process giving a lustrous metallic finish. P. 99

MACHINE SOLDERING

Cuts Costs, Boosts Output — A small manufacturer installed an automatic soldering machine. The unit paid for itself in 13 months. Less operator training is just one of several cost-saving benefits. P. 100

JIGS AND FIXTURES

Good Design Pays—Repair costs can quickly exceed original cost if the tool isn't designed to last. But what really counts is to have jigs and fixtures designed for efficient operation and reduced waste motion. P. 102

MARKETS & PRICES

FARWEST STEEL OUTLOOK

Opinions Are Divided—Western steel mills are still producing above the national average. There's a difference of opinion about what's ahead. Some rehiring is going on, but layoffs continue. P. 85

PRODUCTION

Construction Equipment Up — Despite former cutbacks, at least three major equipment makers will revise output upward. Bigger building programs are the key reason. P. 69

MACHINE TOOLS

Imports Hurt—Builders' association spokesman told Congress foreign competition is threatening national security. Some U. S. builders may not survive without tariff help. P. 87

BUMPING ALONG

Steel in a Trough—Steel output and orders are bumping along the bottom of the recession trough. There's very little news that is good. The mills are working hard to cut their costs until incoming order volume shows a definite uptrend. P. 161

FURNITURE

Buyers' Market—Sharp competition is forcing office furniture makers to offer better styling, more color, immediate delivery and any extras their engineers can come up with. P. 162

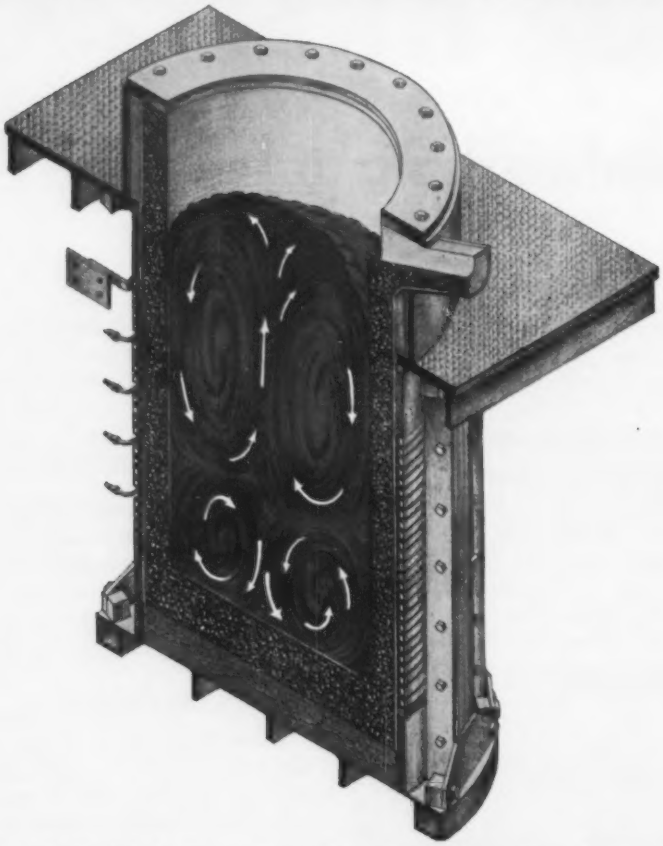
NEXT WEEK

DESIGN SHOW FEATURE

A Constant Search—Next week's feature will reach at the heart of some of the design engineer's problems. The stress is on new materials to meet today's needs. It's in the design stage that ideas can make a big difference in cost savings.

AJAX-JUNKER

a new principle in 60 Cycle induction melting



WHAT IT IS:

- A cylindrical induction coil supplied with ordinary 60 cycle current induces heat and vigorous electromagnetic stirring in the molten metal charge.

Integrated electric controls regulate power, maintain high power factor automatically.

Monolithic refractory linings are made by ramming against the sturdy water-cooled coil held in a rigid frame of magnetic and structural steel.

This new principle was perfected in Europe over the last seven years. Over 100 Junker furnaces are now in use. AJAX-JUNKER designs are based on latest experience, using American components and practices throughout.

WHAT IT CAN DO:

- Outstanding results are proven in these fields:

DUCTILE and ALLOY IRON CASTINGS
RECOVERY OF IRON TURNINGS
RECOVERY OF ALUMINUM SCRAP

Available sizes range from 1 to 10 tons, with normal melting cycles from 2 to 4 hours. Power ratings are 200 kw through 1500 kw.

May We Explore the Possibilities of this New Method with You?

AJAX USA

60 CYCLE INDUCTION MELTING

ENGINEERING CORPORATION

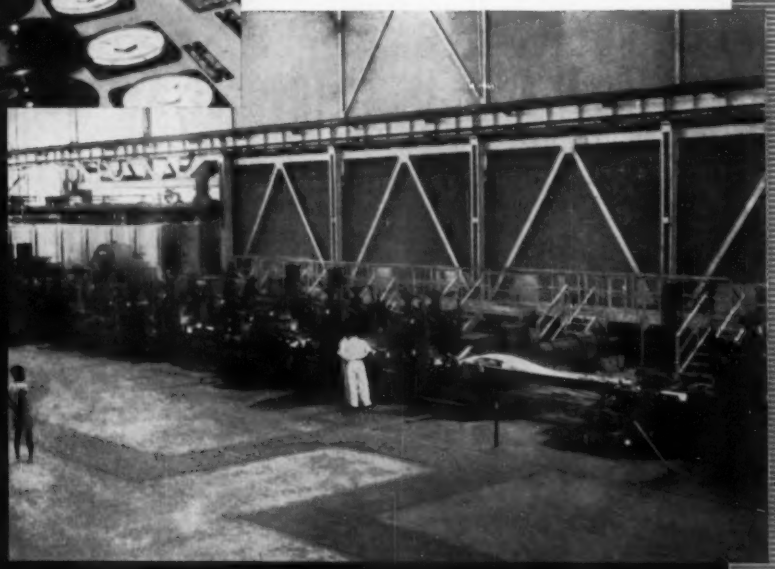
TRENTON 7, NEW JERSEY

Associated Companies: Ajax Electrothermic Corporation Ajax Electric Company

MORGAN MILLS
at work in India

14" SKELP MILL

Tata Iron and Steel Co., Ltd.
JAMSHEDPUR, INDIA



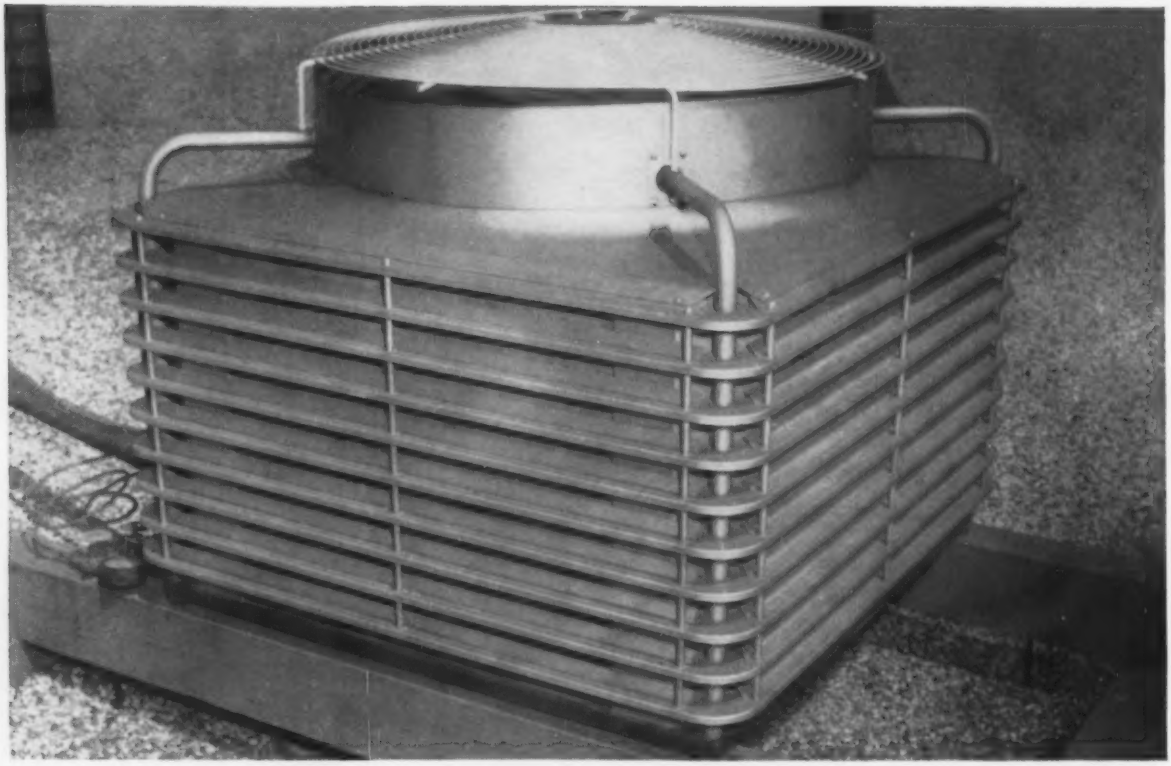
Since 1917 Morgan Construction Company has been contributing skilled engineering talent and precision built continuous rolling mills to the national growth of India. The mill illustrated here is a 14" skelp mill recently installed for the Tata Iron and Steel Company at Jamshedpur.

This modern skelp mill is just one example of two-hundred and twenty-one Morgan Rolling Mills that have been designed, built and installed in plants all over the world.

MORGAN
WORCESTER

MORGAN CONSTRUCTION CO., Worcester, Massachusetts

Rolling Mills • Morgoil Bearings • Wire Mills • Regenerative Furnace Control • Ejectors • Gas Producers RM 75



How Armco ALUMINIZED STEEL Type 2 Cut Costs and Improved Durability of Air Conditioner Housing

Special hot-dip aluminum-coated steel provides low-cost resistance to atmospheric corrosion, eliminates need for paint

A leading manufacturer of air conditioners formerly made the housings for the condenser units from cold-rolled steel. They had to be painted inside and out for surface protection and good appearance. Now, with all sheet metal parts made of Armco ALUMINIZED STEEL Type 2, *only the outside* is painted—and that because of a color identification of long standing.

Production Costs Down

Elimination of paint on the inside of the housing has reduced paint and labor costs 50%. And shop men report that with moderate care, parts can be fabricated of ALUMINIZED STEEL just as easily as with uncoated steel.

Better Durability

Originally the decision to use ALUMINIZED STEEL was based on tests which showed no rusting after 15 years' continuous exposure in an industrial atmosphere. Now service records prove that even under severe conditions the ALUMINIZED STEEL housings have lasting resistance to rust and corrosion, provide much longer service life.

Save on *your* production costs and give your outdoor products customer-attracting durability with the multiple advantages of Armco ALUMINIZED STEEL Type 2. Just fill out and mail the coupon for complete information.

ARMCO STEEL CORPORATION
1628 Curtis Street, Middletown, Ohio

Send me design and fabrication information on Armco ALUMINIZED STEEL Type 2.

We are considering it for_____

NAME_____

COMPANY_____

STREET_____

CITY_____ ZONE____ STATE_____

ARMCO STEEL

ARMCO STEEL CORPORATION • 1628 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

Heavy Industry's Plight
Faster Writeoffs Would Help

The heavy—durable—industry is in trouble. So are industries dependent on it. The recession is mostly in the capital goods sector.

Latest figures suggest further drops in manufacturers' orders and a 13 per cent decline in new plant and equipment spending this year.

Today any plan for fighting the recession—no matter how zany—gets serious attention. Many such plans have a certain vote-getting flavor.

Those who make and those who buy tools, machinery, equipment and plant have been trying for some time to get a hearing on replacement costs and depreciation allowances. Either it wasn't politic to do anything, the question was too "complex" or the inertia was insurmountable.

But now that "something must be done" it is important to reopen the whole question of adequacy of depreciation. A crash program in this area of the economy might pay handsome dividends—for all.

Half of new plant and equipment spending in recent years was done to offset high wage costs. Since wage rates keep going up and since industrial income is going down, more cost cutting tools are imperative.

But to replace a tool, machine or plant today costs from two to four times as much as it did when the original purchase was made. The government allows the buyer to get back only what he paid in the beginning: This despite the fact that costs have only gone one way in the last 25 years—up.

Obstacles to forthright facing up to this situation have been extremely vague. One major behind-the-scenes excuse is that to aid business might be bad politically.

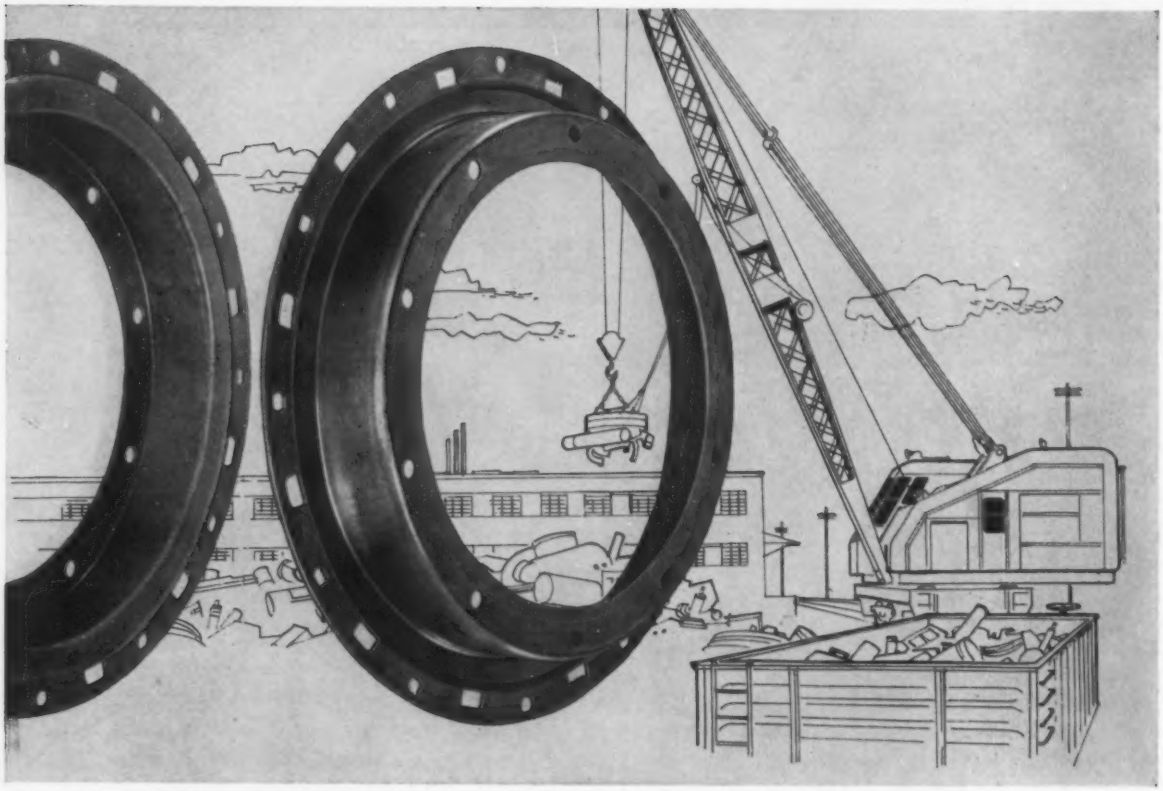
That might be so but lack of solution to the capital goods depreciation problem may have far more serious repercussions. If all industry is given the right to more realistically write off its plant and equipment, heavy industry—and its dependents—will feel immediately the effects of such a policy.

Where is there any greater need for support than in those plants and factories where the unemployment is the greatest and where depreciation reform and revision are so long overdue?

Prompt and clear cut interim relief pending a full study is in order—and will help where help is needed most.

Tom Campbell

Editor-in-Chief



Stampings simplify clutch design

Housings custom stamped to close tolerances by COMMERCIAL eliminate costly machining.

Perfect shape and alignment maintained to assure safe, accurate, dependable control.

Pioneer in the development of air-actuated, functional clutches and brakes for use in many types of industrial and construction machinery, the Airflex Division of The Fawick Corporation uses COMMERCIAL custom stampings for the housings in its Type E air-ring clutches and brakes.

COMMERCIAL helped to design the required strength and close tolerances into these stampings, built the dies to produce them, and has been turning them out for The Fawick Corporation —without change in the original design— since 1944. Stampings are produced in ten different sizes, from 12 to 40 inches in diameter, to meet the varying load requirements of Fawick Airflex Type E clutch applications.

Typical close tolerances throughout each housing of +.005" −.000", +.005" −.005" and +.000" −.010", eliminate the need for costly machining of the stampings before final assembly

Gang-pierced in the stamped housings for the Fawick Airflex Type E clutch assembly, all holes are equally spaced ±.005" and all slots are equally spaced ±.010"

Designed into the stampings as well, is the *inherent strength* required to keep the shape, alignment and overall tolerances of the housings unchanged throughout their life in the field under the most severe operating conditions— constant wear, friction and resultant destructive heat. This unvarying strength in the stampings is an important factor in the dependable and trouble-free performance of Fawick Airflex Type E clutches.

If you have a design problem involving component parts, we may be able to suggest a practical and economical solution based on our 30 years of experience in forming metals Send details of your problem to Commercial Shearing & Stamping Company, Dept. K-13 Youngstown 1, Ohio.

About Meehanite

Sir—I want to congratulate you on your article, "How to Get More for Your Castings Dollar." I think that it is quite complete.

As a foundryman, I thought that some of the tables were particularly interesting.

However, I am certainly surprised that you would try to mislead the public in listing Meehanite metal as a special iron. Meehanite is not a metal; it is merely a production process. Gray irons of identical tensile strengths and physical properties are produced in foundries all over the United States. I certainly think that you are misleading the public in setting it out as a special metal.—C. N. Outman, Asst. to the Pres., Hansell-Elcock Co., Chicago.

▪ We contacted Meehanite Metal Corp. and reprint their reply:

"Gentlemen:

In reply to Mr. Outman's letter, we would advise that there are 26 types of Meehanite metal made throughout the U. S. A., and they are available under four general classifications. These have been developed so as to provide specific materials to meet the broad requirements of industry. Each has its own combination of properties and chemistry.

According to the latest definition in the AFS Handbook, "Gray cast iron covers a wide family of iron-carbon-silicon alloys." It says further, "There is some overlapping between cast iron and malleable iron"; also, "It is difficult to set up a classification or series of classifications for cast iron."

This has also certainly been true of the range of iron-carbon-silicon alloys called "steel." Rather than attempt to mislead your readers, we believe the classifications, adopted to identify the Meehanite metal family, are both logical and proper in that they give to the engineer and casting user defined properties from which he can design positively and with confidence."—Oliver Smalley, Pres., Meehanite Metal Corp., New Rochelle, N. Y.

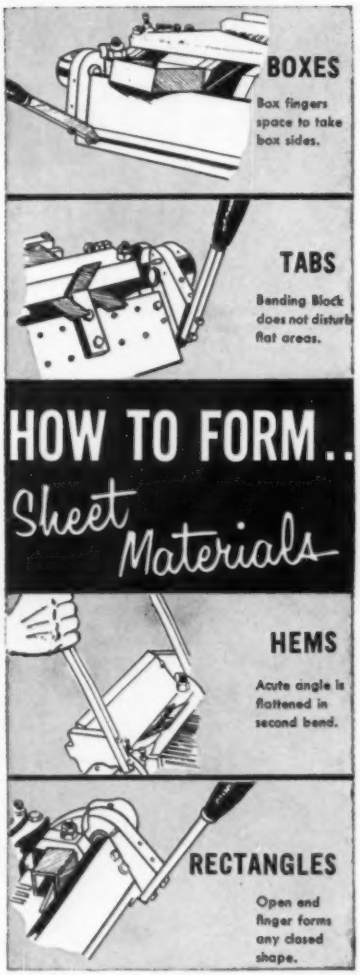
Auto Wiring

Sir—In your Feb. 6 issue, you made mention of the fact that the 1958 model cars used a great deal more wire than earlier models. Specifically, you stated that the 1958 Buicks used almost two miles of wire.

Can you give me the source of your information?—J. K. Johnson, Purchasing Agent, Anaconda Wire & Cable Co., Anderson, Ind.

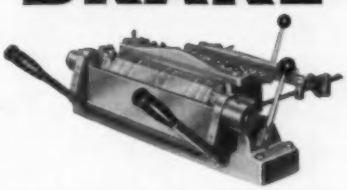
▪ Buick advises it arrived at the nearly two miles of wire used by including motor windings, generator and the rest of the electrical system. The car in question would be a fully equipped 1958 Buick—that is, with power windows, power seats, air conditioning, radio, heater and any of the other electrical options that might be offered.—Ed.

"I'm in a pretty good mood today. How about coming back tomorrow?"



with a

DI-ACRO BRAKE



The Di-Acro Brake is a six-in-one precision metal working machine simply tooled for a variety of jobs. Ten models in 6", 12", 18" and 24" widths handle up to 16 gauge mild sheet steel.

Consult the yellow pages of your phone book for the name of your nearest Di-Acro distributor or write for 16 page "Handy Guide" to . . . Di-Acro Brakes.

pronounced die-ack-ro

di-acro PRECISION METALWORKING MACHINES

O'NEIL-IRWIN MFG. CO.
302 Eighth Avenue
Lake City, Minnesota

What makes

V-Belts with the Green Seal

your best belt buy—

by far

A Special tension members of steel cable or exclusive, synthetic Triple-Tempered (3-T) Cords—carefully tempered with Tension, Temperature and Time for maximum strength with minimum stretch.

B Tension and compression sections of mildew-inhibited rubber compounds—designed to the job—and manufactured to team perfectly with whatever type load-carriers are used.

C Envelope of exclusive, bias-cut fabric impregnated with a minimum dusting, mildew-inhibited, friction-balanced rubber compound for long running without sticking or grabbing in the grooves.

—AND IT PAYS OFF IN

Dimensional Stability for belts that don't shrink or stretch in storage — for matched sets that *stay* matched

High Strength and Low Stretch on the drive — for maximum resistance to shock loads — minimum creep and take-ups

Clean, Smooth-Running Operation for maximum trouble-free, horsepower hours of operation — lowest possible power transmission costs

—SO NEXT TIME YOU NEED V-BELTS

— be sure you get belts with the Green Seal. See your Goodyear Distributor for details. Or write Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

DIMENSIONALLY STABLE V-BELTS with the GREEN SEAL by

GOODYEAR

60th GOODYEAR ANNIVERSARY

THE GREATEST NAME IN RUBBER

Watch "Goodyear Theater" on TV—every other Monday, 9:30 P.M., E.S.T.

Green Seal—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

X Marks the Spot

To get the most authoritative information on how to go about finding the right place to build a new plant, our editors went to Fantus Factory Locating Service in New York.

There, high above the industrial smoke, a staff of 21 experts thumb through thousands of files, getting a perspective on the right spot for Fantus clients.

Facts on File—This unique organization has been combing the nation for likely industrial sites for 35 years. Its files contain industrial profiles of every community in the U. S. with a population over 2000 . . . plus data gathered in carrying out more than 1500 plant location assignments.

In a typical Fantus conference (see cut) L. C. Yaseen, left, senior partner, exchanges notes with E. I. Oppel, L. C. Hoch, and J. W. Carroll.

Mr. Yaseen, by the way, is author of the article: "How to Choose a Plant Site," which begins on p. 121. You should see what he has to say before marking X on the spot where your new plant will go up.

End of an Era?

If you've been getting any bruised beefsteak at the supermarket your worries are over.

An aluminum livestock pen, the first of its kind in the world, is now in service at the St. Louis National Stockyards Co. in Illinois. It was developed by Pioneer Industries, Inc., of Sioux City, Ia., with design and engineering assistance from Kaiser Aluminum & Chemical Corp. In addition to smooth, rounded surfaces that reduce animal bruising, its advantages are listed as long, maintenance-free service, fireproof construction, and a neat, attractive appearance.

Puzzler

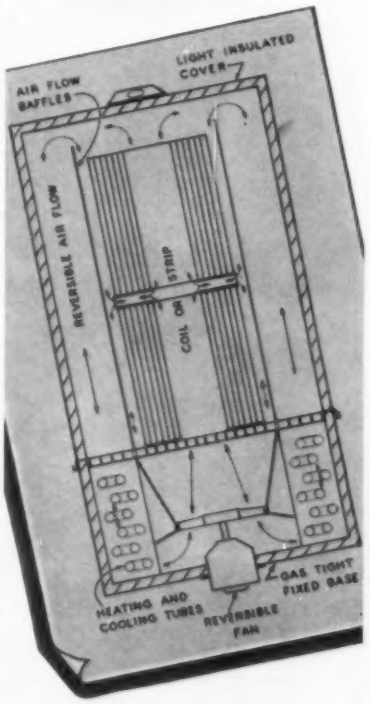
The answer to the Chicken Puzzler (February 27th issue) is:

19	Pigs	$ 95.00
1	Chick	1.00
80	Eggs	4.00
100		$100.00

Winners are: E. V. Angell, Red Seal Metals, Wayne Randle, Warner Gear Div., Joseph R. Scott, Constance Brown, E. J. Lavino & Co., J. E. Dellea, General Electric Co., V. B. Riley, H. B. Smith Machine Co., Mildred F. Howard, Joseph Nivitsky Rack Manufacturers, Inc., Dick Hautzenroeder, W. R. Dunigan, National Carbon Co., James C. Davis, National Tube Div. of U. S. Steel Co.

Also, Herbert Klebaum, Republic Steel Corp., Eddie Martin, Hyde Corp., Manfred Neumann, Lightolier, Jim Wilkes, Mexico Refractories Company, R. C. Underwood, Arabian American Oil Company, Arlan Walker, Iowa Ordnance Plant, Edward A. Bell, Springfield Gas Light Co., A. B. Retallick, Wilbur C. Matterson, Moeller Instrument Company, Larry Krasnov, M. W. Zack Metal Co., Ann M. Sheehan, Surface Combustion Corp., Francis M. Cordone, Pratt & Whitney Aircraft, Rose Lantos, Industrial Welding Company and of course Charlsie & Friends Berry & Letterman of General Steel Castings.

CUT
NON-FERROUS
ANNEALING TIME
33%



R-S Single Stack* Annealing... Faster Heating, Automatic Airflow Reversal... Uniform Heating

Designed for faster heating and cooling with forced convection and automatic airflow reversal—allows absolute uniformity of heating with no spotty sections on coils.

Lightweight, insulated, one-piece cover. Permanent fuel-air connections. Annealing of copper, brass and bronze strip and wire accomplished in only ⅓ of time required for conventional annealing. Only one seal to maintain with one cover to handle. Factory assembled unit with true portability.

Write for details on strip and wire annealing.

R-S FURNACE CO., INC.
NORTH WALES, PA.

*Patent Pending

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"EVERYTHING HINGES ON HAGER!"*

We'll Make *IT* for You! If your hinge requirement is not in Hager's line of over 5,000 different types and sizes of hinges, write or wire specifications: C. Hager & Sons Hinge Mfg. Co., 131 Victor Street, St. Louis 4, Mo.

HAGER HINGES *®

COMING EXHIBITS

Industrial Development Show — Apr. 7-11, Coliseum, New York. (Woods, Donegan & Co., Inc., 48 West 48th St., New York 36.)

Design Engineering Show — April 14-17, International Amphitheatre, Chicago. (Clapp & Poliak, 341 Madison Ave., New York 17.)

Welding Show—Apr. 14-18, Kiel Auditorium, St. Louis. (Banner & Greif, 369 Lexington Ave., New York 17.)

Powder Metallurgy Show — April 21-23, Sheraton Hotel, Philadelphia. (Metal Powder Assn., 420 Lexington Ave., New York 17.)

Tool Engineers Show — May 1-8, Convention Hall, Philadelphia. (American Society of Tool Engineers, 10700 Puritan Ave., Detroit 38.)

Western Material Handling Show—May 8-10, Great Western Exhibit Center, Los Angeles. (Information: 2809 Sunset Blvd., Los Angeles 26.)

Southwestern Metal Show — May 12-16, State Fair Park, Dallas. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

Foundry Show—May 19-23, Public Auditorium, Cleveland. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

MEETINGS

APRIL

Concrete Reinforcing Steel Institute —Annual meeting, Apr. 6-12, The Boca Raton Hotel, Boca Raton, Fla. Society headquarters, 39 S. Dearborn St., Chicago.

Wire Reinforcement Institute, Inc. —Annual spring meeting, Apr. 7-8, Hotel Boca Raton, Boca Raton, Fla. Society headquarters, National Press Bldg., Washington.

Industrial Fasteners Institute—Annual meeting, Apr. 8-10, Boca Raton Hotel, Boca Raton, Fla. So-

(Continued on P. 16)

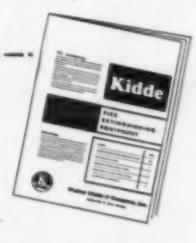
24-HOUR-A-DAY AUTOMATIC FIRE PROTECTION!

Install a built-in Kidde Fully-Automatic Carbon Dioxide Fire Extinguishing System, and you install the finest, most dependable round-the-clock fire protection on the market today. Individually designed to fully guard even the most dangerous hazards, Kidde systems offer tailor-made fire protection for dip tanks, spray booths, oil bath air filters, record vaults, generator rooms . . . *any* hazard in which fire can develop and spread!

Because they use dry, clean non-damaging carbon dioxide as an extinguishing agent, Kidde systems can be installed to protect intricate machinery or delicate electrical equipment. Carbon dioxide smothers fire the instant it starts, then vanishes quickly into thin air. It leaves no mess, no clean-up job afterwards!

Kidde systems are pressurized – there are no falling weights, no clumsy mechanical triggering methods. Special rate-of-temperature-rise detectors trigger the system at the first flash of fire, Pneumatic control heads insure instantaneous and complete system discharge. All operating parts are self-enclosed for safety. Visual indicators show at a glance whether system is "set" or "released." Directional valves allow protection of more than one hazard from the same bank of cylinders. There are no parts to replace after a fire.

For more information on Kidde systems, and how they can protect your plant from fire, send the coupon or write today for Kidde's Engineered Fire Equipment Booklet.



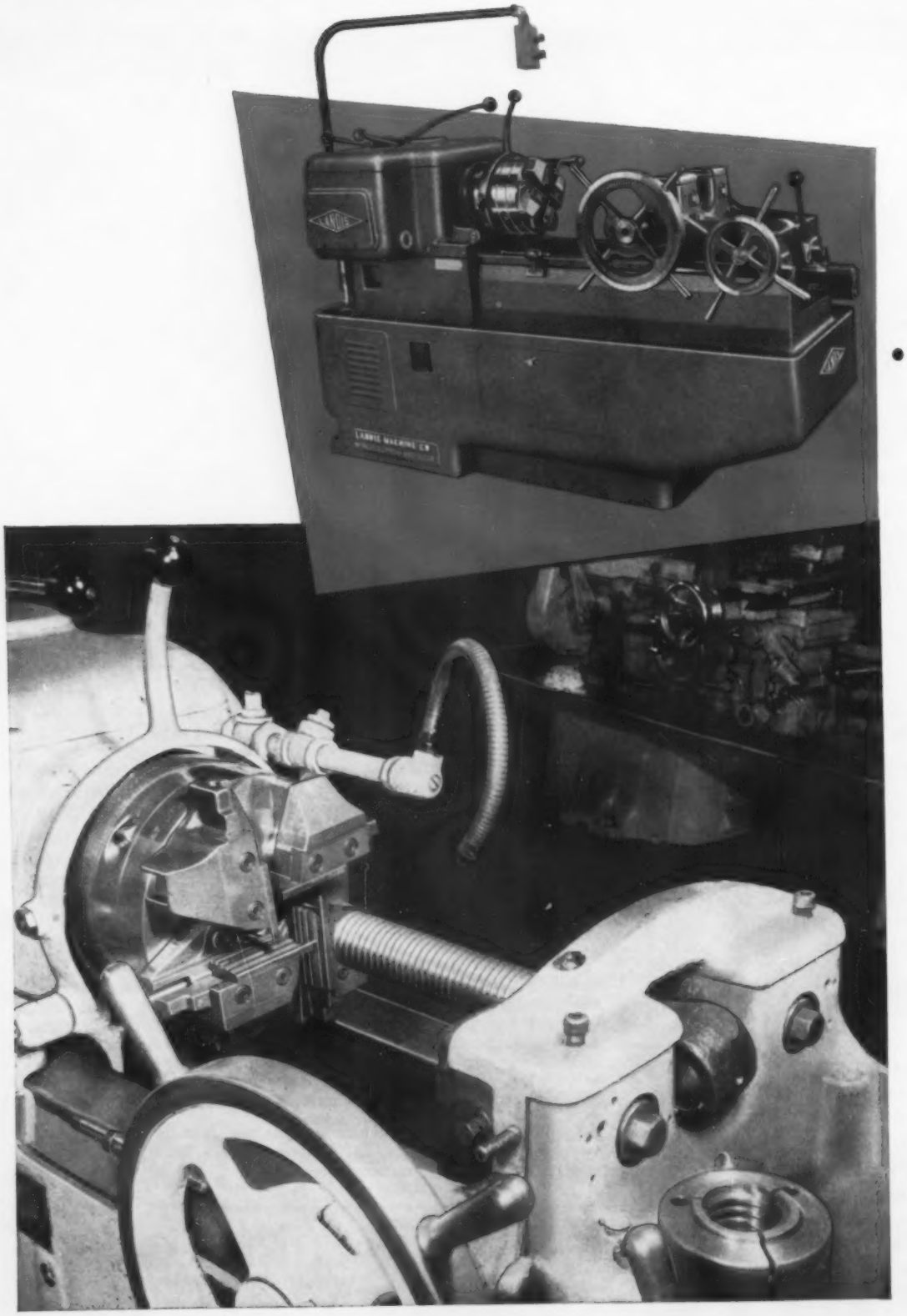
WALTER KIDDE & COMPANY, INC.
349 MAIN STREET, BELLEVILLE 9, N. J.

*Please send me your Engineered Fire Equipment Booklet, I-19 and complete information on Kidde systems. I am interested in protecting the following hazards:*_____

NAME_____

ADDRESS_____

CITY_____ **STATE**_____



461-C -2

coarse threads

cut in one pass with LANDMACO machines

The cutting of large diameter Acme threads at the Iowa Manufacturing Co. of Cedar Rapids, Iowa, illustrates the heavy duty threading possible on LANDMACO Threading Machines.

1045 steel forgings of 20-29 Rockwell C are used in the production of adjusting screws for construction equipment. 2¼"-3 pitch Special Acme threads (EXTRA DEEP) are cut 10" long, with a .026 pitch diameter tolerance and a .001 per inch allowable lead error.

Cutting at a speed of 7.6 surface feet per minute, 12.5 pieces are completed per hour. This includes 100% gaging on the machine, using go-and-no-go gages. Despite the large amount of metal removal, at least 80 pieces are produced between chaser grinds.

This job is an excellent example how such heavy-duty threading can be done with the LANDMACO Machine. The 2½" Single Spindle Machine (½" to 2½" range) used here features heavy construction, hardened-and-ground ways, lead screw attachment, and is equipped with a rugged LANCO Tangential Chaser Die Head. Roughing-and-Finishing Centering Throat Chasers produce heavy cuts in one pass of excellent finish, eliminate the out-of-roundness common in long heavy workpieces, and provide low tool cost.

LANDMACO Machines offer precision and heavy duty threading within a range of #4 to 4" in diameter. For more detailed information, please send specifications when writing.

THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT - CUTTING - TAPPING - GRINDING - ROLLING

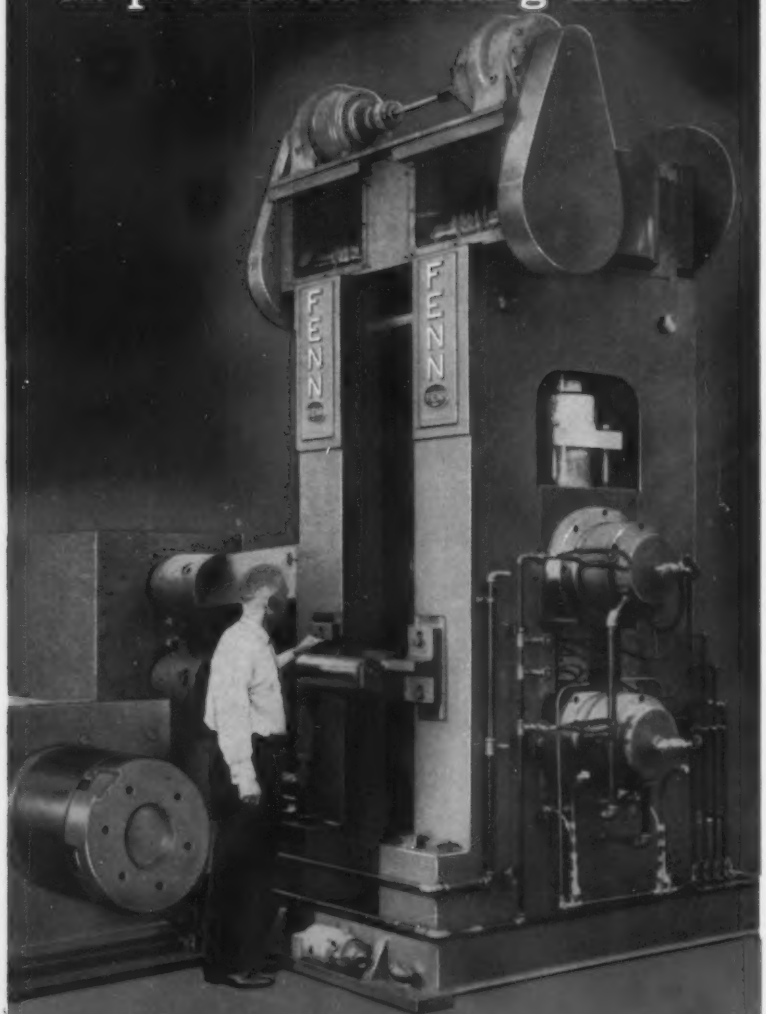
LANDIS Machine COMPANY WAYNESBORO PENNSYLVANIA

With the big ones, too

FENN

Sets the Pace

in precision rolling mills



The inherent design of Fenn Rolling Mills achieves greater flexibility . . . extremely high separating forces . . . with dependability that only building to the highest quality standards can provide. Typical is the large heavy duty Fenn Precision Rolling Mill illustrated above. A combination Two-High/Four-High mill, with 16½ " diameter rolls, it offers extreme versatility in rolling new alloys with high tensile strengths and is adaptable to either hot or cold rolling.

THE FENN MANUFACTURING COMPANY • 302 FENN ROAD • NEWINGTON, CONN.

EXHIBITS, MEETINGS

(Continued from P. 13)

ciety headquarters, 1517 Terminal Tower, Cleveland.

Copper And Brass Warehouse Assn., Inc. — Annual convention, Apr. 13-16, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 1900 Arch St., Philadelphia.

The American Zinc Institute — Annual meeting, Apr. 14-15, The Chase-Park Plaza Hotels, St. Louis, Mo. Society headquarters, 60 E. 42nd St., New York.

The Metallurgical Society of AIME —41st Openhearth steel and blast furnace, coke oven, and raw materials conference, Apr. 14-16, Statler Hotel, Cleveland. Society headquarters, 29 W. 39th St., New York.

Lead Industries Assn. — Annual meeting, Apr. 15-16, Chase-Park Plaza Hotels, St. Louis, Mo. Society headquarters, 60 E. 42nd St., New York.

Steel Shipping Container Institute —Annual meeting, Apr. 14-18, Kenilworth Hotel, Miami Beach, Fla. Society headquarters, 600 Fifth Ave., New York.

Institute of Environmental Engineers — Annual meeting, Apr. 17-18, New Yorker Hotel, New York. Society headquarters, 9 Spring St., Princeton, N. J.

American Home Laundry Mfrs. Assn. — Annual meeting, Apr. 22-24, Boca Raton Club, Boca Raton, Fla. Society headquarters, 20 N. Wacker Dr., Chicago.

Scientific Apparatus Makers Assn. —Annual meeting, Apr. 20-24, El Mirador Hotel, Palm Springs, Calif. Society headquarters, 20 N. Wacker Dr., Chicago.

cool metal for hot planes

For jet and rocket aircraft engines, wings and surfaces that are subject to extreme conditions of heat, friction and corrosion, where the metal *must stand up* . . . design it, improve it and protect it with McLOUTH STAINLESS STEEL.

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McLOUTH STAINLESS STEEL

HIGH QUALITY SHEET AND STRIP

for aircraft

McLOUTH STEEL CORPORATION DETROIT, MICHIGAN

MANUFACTURERS OF STAINLESS AND CARBON STEELS

the trend is to THOMAS *for*

PRODUCTION BENDING

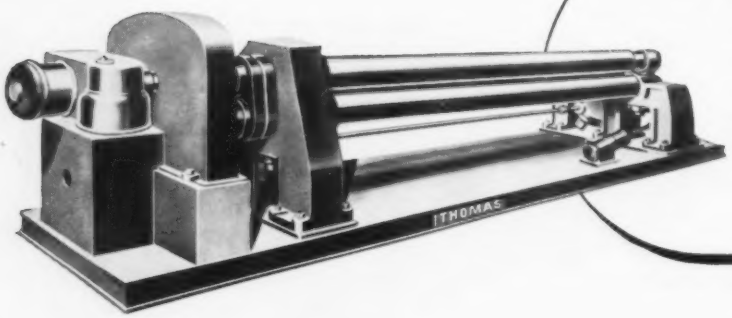
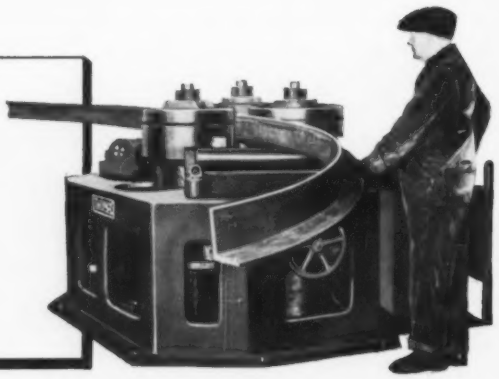


Plate Bending

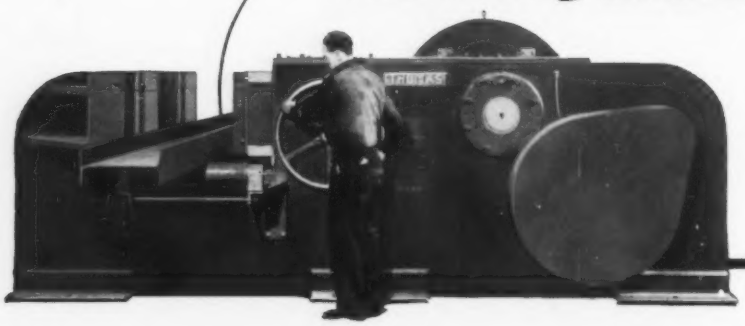
The Thomas line of Initial or Pinch Type Plate Rolls is comprised of twelve sizes of all steel machines completely modern in design. Features include enclosed drive running in oil; power adjustment and power drop-end.

Angle Bending

Thomas All Steel Angle Rolls are built in both vertical and horizontal styles, and capacity range is from 2 x 2 x ¼" to 6 x 6 x ⅞" angles. Shapes other than angles may also be bent by using special rolls.



Bending and Straightening



Thomas All Steel Bending and Straightening Machines, for cold working of structurals; Bars; Billets; Rails and other shapes, — built in six sizes — from 50 to 400 tons.

The machines shown are but a few of the types Thomas builds. If you have an equipment problem which involves Bending, Shearing, Pressing or Punching call on us.

THOMAS
MACHINE MANUFACTURING CO.
PITTSBURGH 23, PA.

PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

71

Lehmann 18" Hydratrol lathe turning 4" Nitralloy 135 modified bar stock. Tool is K7H carbide nitriding steel. Feed .011", depth of cut .100", speed 300 sfm. Coolant is 20% emulsion of Gulfcut Heavy Duty Soluble Oil.

You can make heavier cuts... at higher speeds...with new GULFCUT HEAVY DUTY SOLUBLE OIL

Norton Type C Cylindrical Grinder grinding SAE 4140 steel connecting rod bolts to 4 micro-inch finish. Speed is 225 sfm, depth of cut .020" with 30" x 1" aluminum oxide wheel. Emulsion concentration 32:1 Gulfcut Heavy Duty Soluble Oil.

This aluminum connecting rod and piston assembly was turned at 4000 sfm to a 6-micron rms finish with Gulfcut Heavy Duty Soluble Oil.

You'll get finer finishes, too, when you use new GULFCUT HEAVY DUTY SOLUBLE OIL

For threading, boring, facing, turning, grooving, grinding, or any operation that requires an emulsifying oil, you'll get better results with new Gulfcut Heavy Duty Soluble Oil. On tough jobs where other general purpose oils have failed, Gulfcut Heavy Duty Soluble meets all requirements—even on low machinability metals.

This new oil is economical, too. An average mixture of 1 part to 25 parts of water provides good cooling and superior lubrication. In many field tests, it has performed well even in mixtures of 1 to 150!

Gulfcut Heavy Duty Soluble Oil won't separate or gum in wheels, slides, ways or other machine parts. It provides greater protection against rust . . . has excellent emulsion stability, even in hardest water . . . has high surface-wetting properties for more effective cooling . . . and contains powerful anti-foam and anti-weld agents. In addition, it contains an effective germicide to help eliminate rancidity.

To improve your production and cut your machining costs, try new Gulfcut Heavy Duty Soluble Oil. For more information, just call a Gulf Sales Engineer at your nearest Gulf office. Or use the coupon on the next page to get illustrated booklet.

GULF

In the complete Gulfcut line, there's a cutting oil to meet your every need

By ordering "Gulfcut" you can select from many different shop-tested cutting oils, including mineral-lard oil, sulfurized-mineral oils, sulfurized-mineral-lard oils, sulfo-chlorinated-lard oils, and emulsifying oils. Your Gulf Sales Engineer will gladly advise you.

GULFCUT 11A AND 11D

Non-staining, non-corrosive mineral-lard oils, recommended for machining non-ferrous metals.

GULFCUT 21A, 21B AND 21C

Sulfurized-mineral oils made by a special Gulf process to provide greater sulfur activity over a wide range of machining operations. They are transparent and relatively light in color.

GULFCUT 31A AND 31C

Sulfurized-mineral-lard oils that excel over a wide range of machining operations on many types of steel. Have outstanding anti-weld properties and load carrying ability. Sulfur is combined in three different forms for maximum chemical activity.

GULFCUT 43A

Sulfo-chlorinated oil for high production machines requiring an oil of this type for pipe cutting and threading, screw and bolt making machines, and cutting operations on steels with free and moderate machinability characteristics. Contains a corrosion inhibitor to protect ferrous metals and machine parts.

GULFCUT 43B

Specially blended sulfo-chlorinated-lard oil for high production machines requiring an oil of its viscosity and compounding. Dual purpose—suitable for machine lubrication as well as for cutting operations.

GULFCUT 45A AND 45B

High quality sulfo-chlorinated-lard oils with excellent load carrying and anti-weld characteristics to insure best results on the most difficult jobs. Have heavy concentrations of sulfur, chlorine and fatty oil. May be diluted for less difficult jobs.

GULFCUT 41A, 41B AND 41C

Sulfo-chlorinated-lard oils for high production jobs on automatic machines. Engineered with the proper combination of sulfur, chlorine and fatty oil. They also provide proper lubrication for machine tools.

GULFCUT 41TG

This is a sulfo-chlorinated-lard oil specifically compounded for thread grinding operations.

GULFCUT SOLUBLE OIL

Emulsifying oil with a wide range of uses in cutting, forming and rolling operations where a coolant with moderate lubricating properties is required. Mixes with warm or cold water as high as 100 to 1. Forms homogeneous and exceptionally stable emulsions.

GULF OIL CORPORATION
Dept. DM, Gulf Building
Pittsburgh 30, Pa.

Yes! Send me illustrated bulletin on

- ☐ Gulfcut Heavy Duty Soluble Oil
- ☐ Gulfcut "Regular" Cutting Oils

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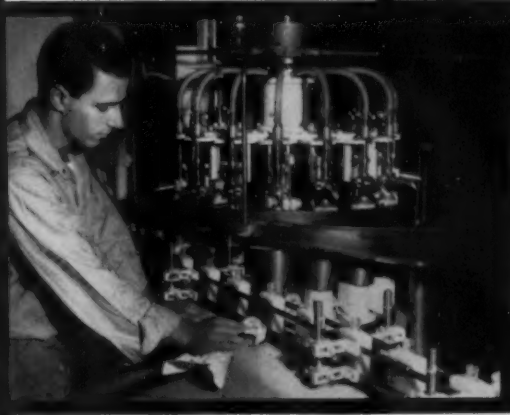
SP 9283

GULF

THE FINEST PETROLEUM PRODUCTS
FOR ALL YOUR NEEDS

people
buy
Scott Wipers
for
many
reasons:



Mr. Arthur Schute (right), Plant Manager at Revlon, says: "Scott Wipers are soft and absorbent, yet strong. We use them on production lines, filling lines, for cleaning ink from coding machines, for wiping oil and grease, and of course our employees use them for wiping hands and face."

Revlon saves $4,000 annually with Scott Wipers!

Revlon, Inc., at Passaic, N. J. has used Scott Wipers for about 15 months . . . for personal wiping, equipment wiping and miscellaneous clean-ups. Benefits: a high degree of sanitation in packaging operations and overall savings of $4,000 annually in wiping costs. Scott Wipers have eliminated the costs of cloth wiper distribution, collecting, sorting and laundering . . . are merely issued, used and tossed into handy receptacles.

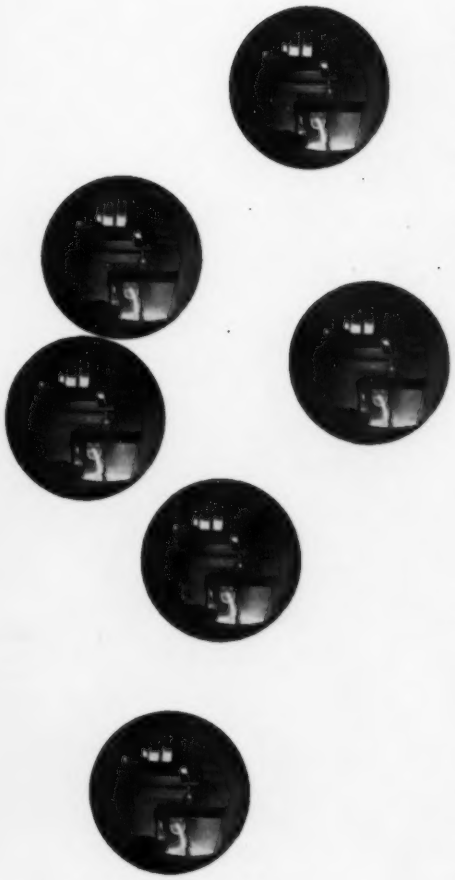
SCOTT PAPER

Get the complete Revlon case history, with cost figures, from your Scott distributor. He's in the Yellow Pages under "Paper Towels." Or write: Scott Paper Company, Dept. IA-83 Chester, Pa.

Makers of the famous Scott paper products you use in your home. See "Father Knows Best" and "The Gisele MacKenzie Show" on NBC-TV.

YOU'VE RELIED UPON THIS MARK FOR *QUALITY*...

now... look to it for a new solution to your steel inventory problems



Here's how Carpenter's *doubled capacity* will help you keep steel inventories at *realistic levels* and cash tie-ups *at a minimum*, through both high and low demand periods:

You know the cost of excessive inventories. You tie up cash precisely when you need it most. Large inventories cost much more to carry than the inventory you actually need for current production.

Now . . . through Carpenter's acquisition of electric furnace steelmaking facilities in New England (which *doubles* our ingot capacity) we've approached this problem from *your* side of the fence.

Today, you're doing business with a company *twice* as big as it was a year ago. This permits us to provide a plan by which customers can *reserve mill output ahead* of time . . . eliminating the need to protect yourself by ordering far ahead . . . eliminating the necessity for placing excessively large orders in periods of peak demand.

And if you order steel out of local warehouse stocks, this same plan assures continuous, dependable deliveries.

Now, and when steel demand is again on the upswing, we are putting steel "in the bank" for you. We are carrying extra large stocks of semi-finished steel in reserve . . . enough to take care of emergencies for all customers subscribing to the plan. Moreover, we can offer this plan to *more* steel users than ever before!

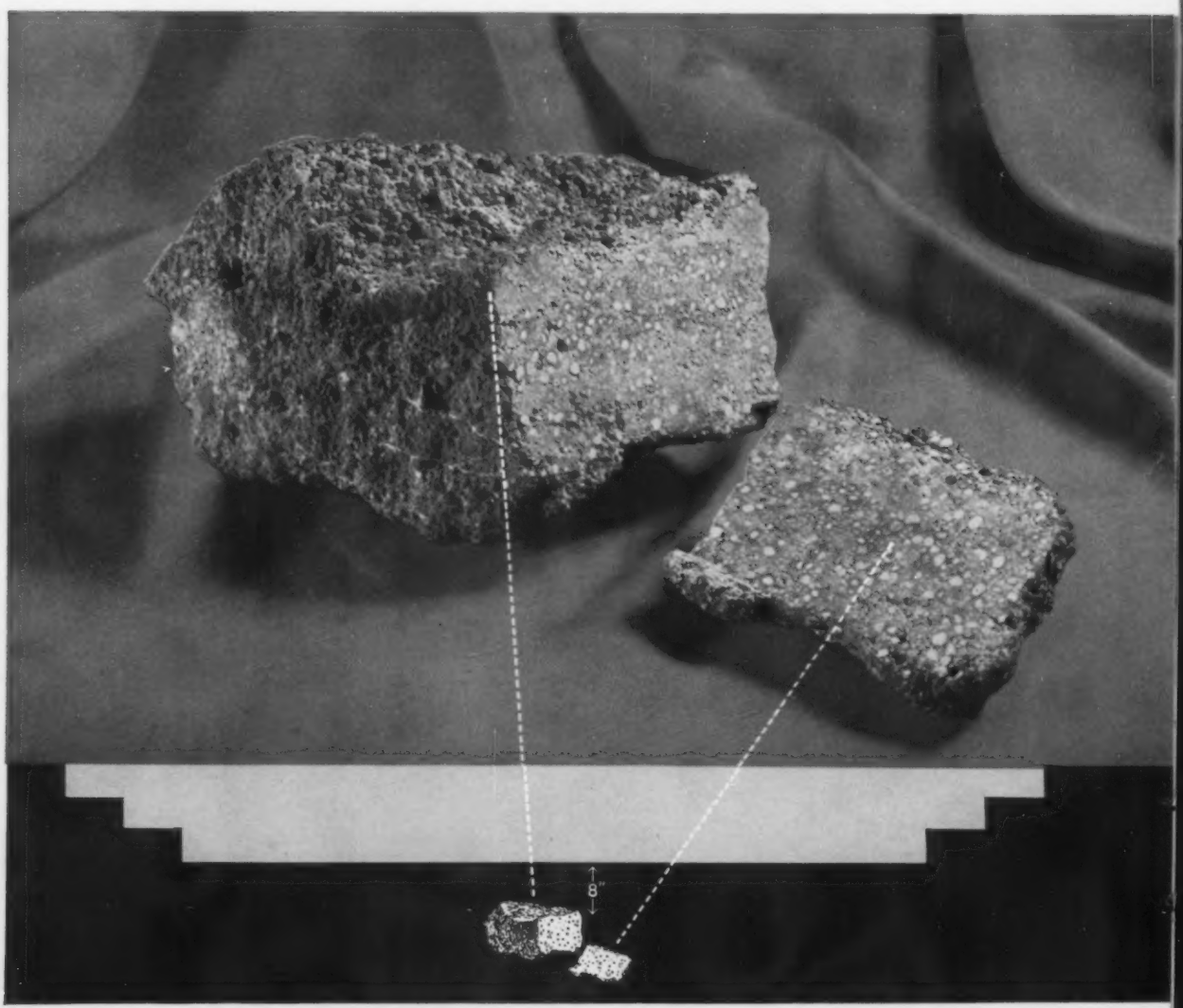
Today, while we're implementing this new service, is the time to go along with us. By acting now, you assure yourself of a steady supply of Carpenter top quality Tool, Stainless and Alloy steels right through the next period of peak demand.

This is our vote of confidence in *your* future. It's one more example of a forward-thinking program of Carpenter service designed with *your* needs in mind.

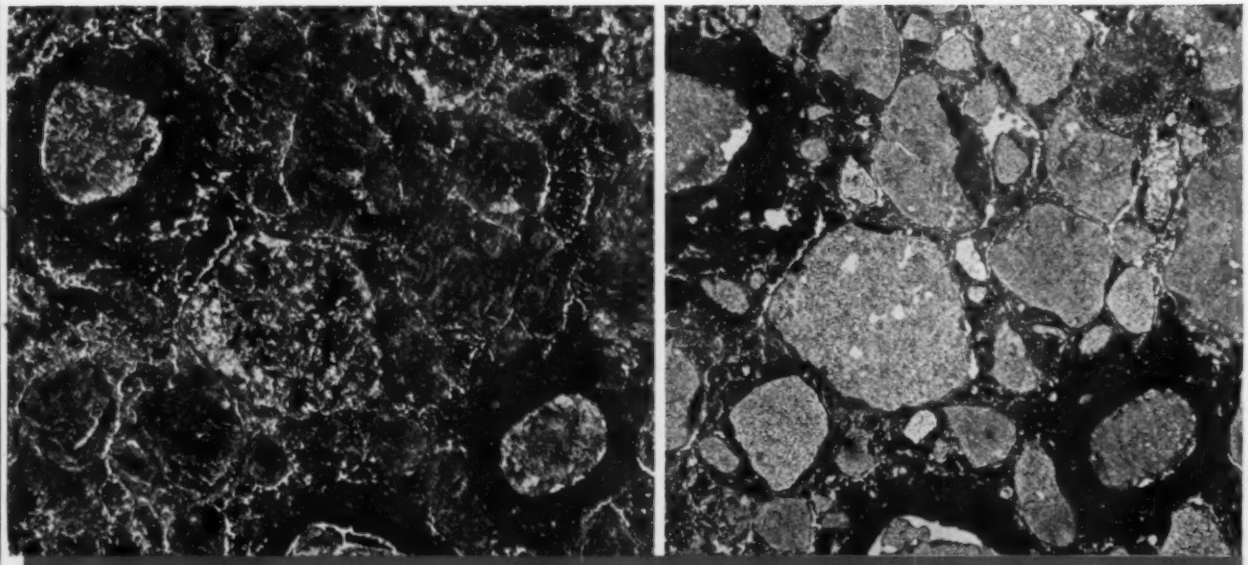
The Carpenter Steel Company, Main Office and Mills, Reading, Pa.

Alloy Tube Division, Union, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.
Webb Wire Division, New Brunswick, N. J.

Permanente 165 Bottom as tough as new after 3½ years service



Unretouched photograph of actual specimens taken from 8 inches below working surface of Open Hearth bottom at center of furnace opposite #2 door. Furnace has 265 ton capacity and an operating rate of 10 hours and 45 minutes. 587,010 tons of regular carbon steel were tapped on this bottom.



These photomicrographs (enlarged 15 times) were taken from a thin section and show the mineralogical and textural characteristics typical of the complete specimen.

The coarser grains show no signs of having been altered or corroded during the 3½ years service period. The bond between coarser grain and matrix appears strong.

The fine matrix portion, although penetrated by calcium, has not been deteriorated. In fact, the filling of voids by calcium components tends to inhibit penetration of possibly more corrosive materials.

These specimens of Permanente 165 Ramming Mix were taken from eight inches below the rammed working surface of an Open Hearth furnace at a major steel plant. They were then submitted to Kaiser Chemicals research laboratories for chemical analysis and petrographic examination.

Here, briefly, are the findings of the laboratory tests:

1. The specimens are in excellent condition, with the components firmly bonded together.

2. Except for minor amounts of calcium and traces of other compounds, the specimens have not been significantly penetrated or contaminated by components of furnace charge or slag.

CHEMICAL ANALYSIS:

The results of the chemical analysis of the specimen are tabulated below:

Moisture loss (110°C for 2 hours)	0.24
Ignition loss (1000°C for 1 hour on dried sample)	0.92

	Analysis on Dried Basis	Typical Analysis
SiO_2	3.02	2.4
Cr_2O_3	0.94	1.0
Fe_2O_3	0.70	0.6
Al_2O_3	0.58	0.3
CaO	7.42	1.1
MgO (by diff.)	87.34	94.6
Na_2O	trace	
SO_3	trace	

These tests confirm once again the reasons why Permanente 165 Ramming Mix lasts longer than other materials . . . requires fewer repairs and less down time . . . helps produce greater tonnage at lower bottom cost.

Permanente 165 is made from high purity Kaiser Periclase refractory grains (94-96% MgO), and ceramically bonds itself into a crystalline mass at relatively low temperatures. This produces a bottom with maximum resistance to hydration and attack by iron oxide and slag. Its installed high density—averaging 175 pounds per cubic foot—assures longer life.

Why not ask your Kaiser Chemicals Sales Engineer to show you how this superior ramming mix can help you get greater steel tonnage at lower bottom cost?

Call or write Kaiser Chemicals Division, Dept. S-8121, Kaiser Aluminum & Chemical Sales, Inc., at any of the regional offices listed below:

PITTSBURGH 22, PA. . . . 3 Gateway Center
HAMMOND, IND. . . . 518 Calumet Building
OAKLAND 12, CALIF. . . . . 1924 Broadway

KAISER CHEMICALS

PIONEERS IN MODERN BASIC REFRACTORIES

REFRACTORY BRICK AND RAMMING MATERIALS • CASTABLES & MORTARS
MAGNESITE • PERICLASE • DEADBURNED DOLOMITE • ALUMINAS

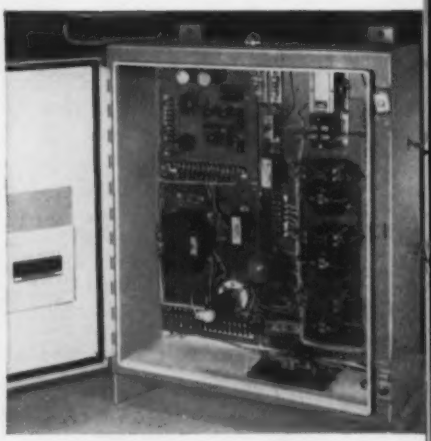
AIR REDUCTION *announces*

AIRCOMATIC PULL GUN—built-in drive rolls pull the wire all the way. Handles hard wire from .020 through 1/16th inch diameter; soft wire from .030 through 1/16th inch. Two models: 200 amperes, air-cooled; 350 amperes, water-cooled.

Push Gun handles hard wire from .035 through 3/32 inch diameter; soft wire from 3/64 through 1/8 inch. Two models: 350 amperes and 500 amperes, water-cooled.

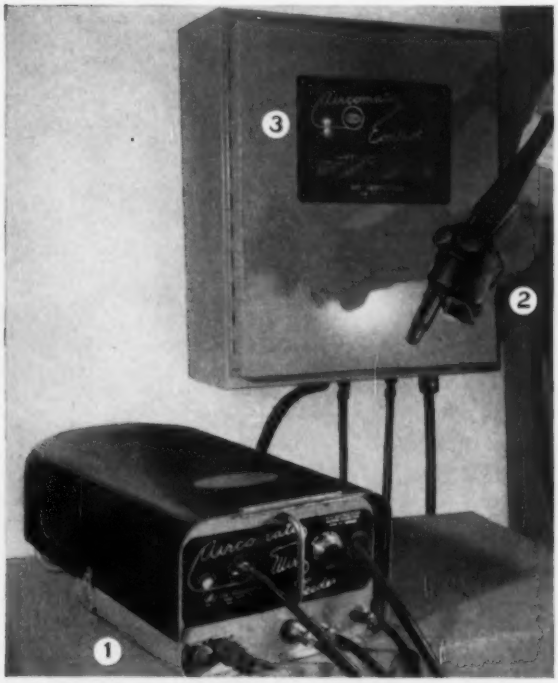
AIRCOMATIC WIRE FEEDER—shown here with cover removed. Motor compartment at left, bracket support for wire at right, reel deck at rear. Note speed control knob and carrying handle on front of unit. Model for use with Push Gun designed with drive rolls substituted for wire bracket. Adaptable for bulk wire system.

UNIVERSAL CONTROL PANEL—for permanent installation near welding power source. Components are easy to reach. Most are plug-in. All sub-assemblies packaged to be replaceable as sub-assemblies. Motor speed control circuits printed on their mounting panel. High efficiency, low maintenance features such as these are typical of the 1958 AIRCOMATIC units.



the new **AIRCOMATIC®** *package...*
most flexible welding system in the industry

- **push or pull operation—to handle wide range of wire diameters**
- **welds from 1/16" aluminum sheet up**
- **compact, portable—operates up to 100 feet from control panel**
- **stepless self-regulating speed control**



MAIN COMPONENTS of the new Aircomatic package.

1—Portable Aircomatic Wire Feeder, adaptable for push or pull operation; can go anywhere a man can go, up to 100 feet from the control panel.

2—Aircomatic Pull Gun; or, for larger wire, the No. 21 Standard Aircomatic Push Gun (not shown).

3—Universal Control Panel, designed so that every element you ever have to handle is readily available for instant inspection.

The new AIRCOMATIC package, developed by Air Reduction engineers, now enables you to select a system that meets your exact welding needs.

Rugged heart of the system is the electronically controlled AIRCOMATIC WIRE FEEDER, which can be adapted to either pull or push operation.

Teamed with the Wire Feeder is the new AIRCOMATIC PULL GUN, designed particularly for small diameter wires . . . and the No. 21 AIRCOMATIC PUSH GUN, designed for heavier operations.

Completing the package is the all-new AIRCOMATIC UNIVERSAL CONTROL PANEL, featuring many advancements unique to such equipment.

In addition to the basic units, the 1958 Airco line includes remote speed controls, color coded wire guides, and kits for all guns and wire sizes.

Have you a tough application in mind? Send for literature. Then call your nearby Air Reduction sales office—and let a Technical Representative help you choose matched equipment to do the job.

Trade in your old equipment. See your Airco representative about a favorable trade-in of your old metal inert gas welding equipment towards the new Airco Aircomatic package.

See the New Aircomatic Package in Action

VISIT OUR BOOTH 401

AT THE AWS WELDING SHOW — **APRIL 15-16-17 ST. LOUIS, MO.**

AT THE FRONTIERS OF PROGRESS YOU'LL FIND . . .

AIRCO®

Offices in most principal cities

AIR REDUCTION SALES COMPANY

A division of Air Reduction Company, Incorporated
150 East 42nd Street, New York 17, N. Y.

On the west coast—
Air Reduction Pacific Company

Internationally—
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In Cuba—
Cuban Air Products Corporation

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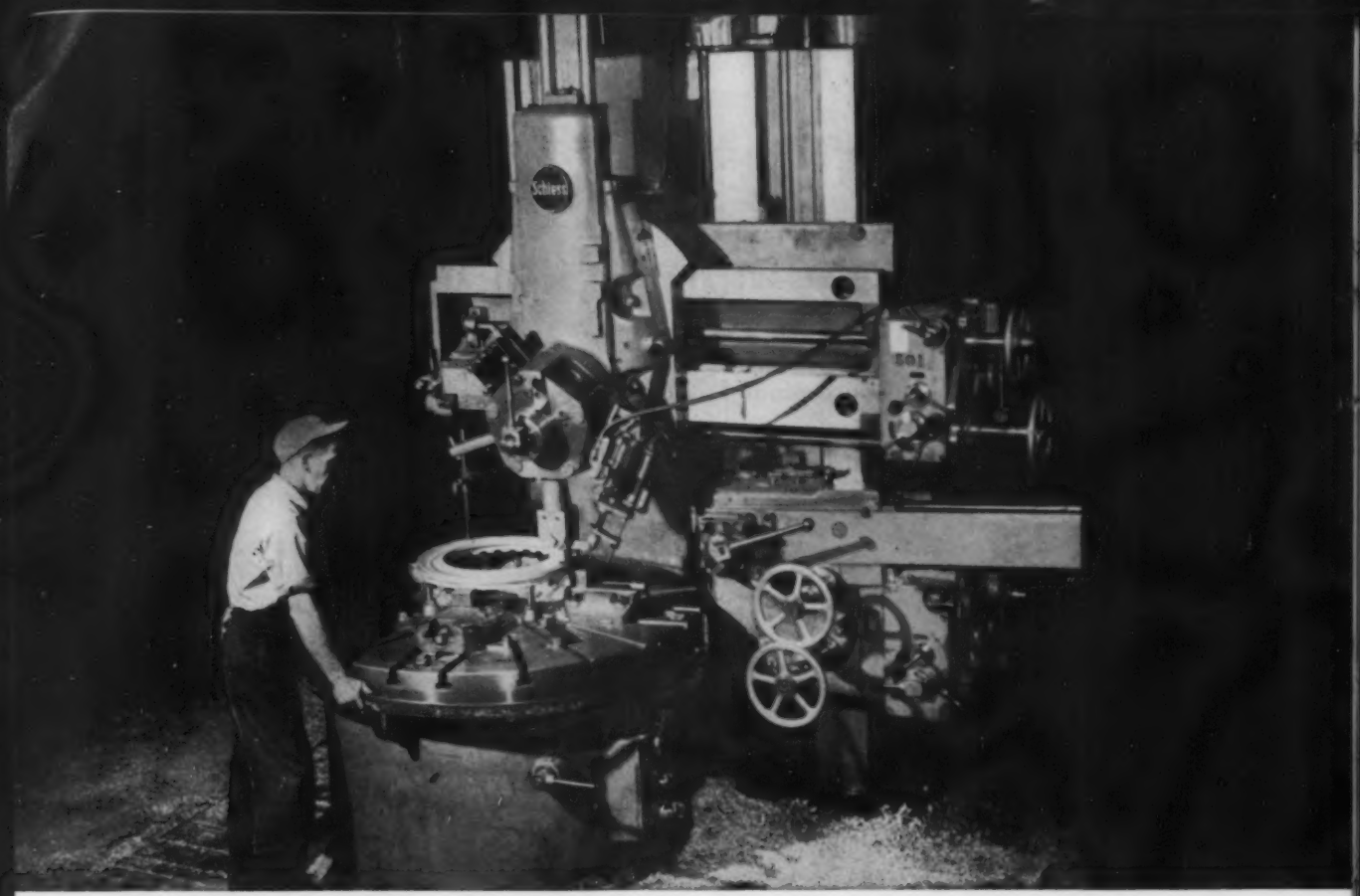
Air Reduction Canada Limited

Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO** — industrial gases, welding and cutting equipment, and acetylenic chemicals • **PURECO** — carbon dioxide — gaseous, liquid, solid ("DRY-ICE") • **OHIO** — medical gases and hospital equipment • **NATIONAL CARBIDE** — pipeline acetylene and calcium carbide • **COLTON** — polyvinyl acetate, alcohols, and other synthetic resins.



"Now, with our Schiess vertical turret lathe
one 8-hour shift does the work of three!"

says Arnold R. Kline, plant manager, O.K. Rubber, Inc., Littleton, Colo.

Schiess 13EK-150 Vertical Turret Lathe turning a 33 in. "Nu-Matic" tire mold sidewall plate, made of #12 cast aluminum.

"Production on sidewall tire molds jumped 300%. Material spoilage was reduced 50 to 60%. Per unit cost dropped 60%. And we have a better machined end product!" That's the way Arnold Kline wraps up the production story at O.K. Rubber, since he installed this Schiess machine.

He continues: "We've got the Schiess mill doing everything from boring 1¼ in. holes to turning plates 56 in. in diameter. We thought we'd need a custom-made mill to do our kind of work. We don't think that way any more."

"And frankly, we were amazed at the price—30 to 40% lower than we expected!"

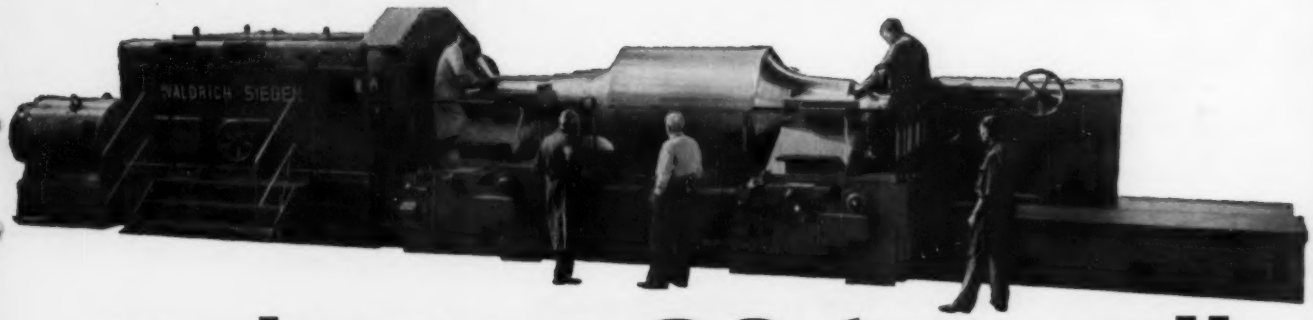
No costly training time was needed. Skilled machinists were checked out on the mill in just a few hours. Operators particularly liked the horizontal head, the rapid traverse lever, the cross-rail mechanical controls. All contributing to greater accuracy . . . better finish . . . less machining time.

Get to know this and other products of Europe's largest builder of heavy machine tools. Parts and service are as close as Pittsburgh. An American Schiess engineer will be happy to help you select the proper tool for your production needs. Write today.

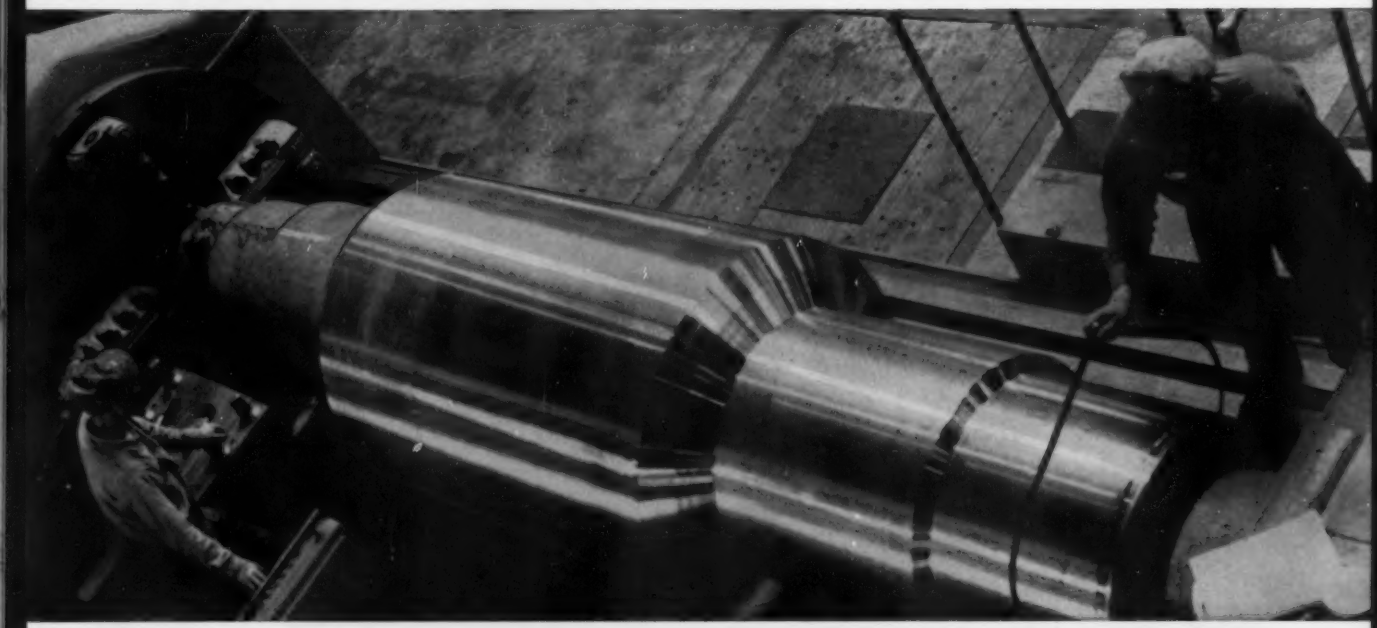
SCHIESS

AMERICAN SCHIESS CORPORATION • 1232 Penn Avenue, Pittsburgh 22, Pa.

this Waldrich giant



swings a 90-ton roll



—cuts rough turning time 75%

You're looking at the business end of a Waldrich-Siegen Roll Turning Lathe, built to turn a workpiece as long as 30 ft., as fat as 63 in. in diameter, and as heavy as 90 tons!

Right now, you're seeing it in action at the Ohio Steel Foundry Co., Lima, Ohio, biting into a 57-ton, 98-in. long roll, with a 53-in. O.D. In just three passes, its hungry cutters will shear 15 inches of steel off this diameter. Before it's through, 12 tons of turnings will come off.

This job used to take 68 hours at Ohio Steel Foundry. The husky Waldrich breezes through it in just 16½ hours flat.

It takes plenty of muscle to peel through so much steel and the Waldrich has it, delivering 250 horsepower to the spindle. Speed is set at the selector wheel, feed at each of the two independent carriages.

And here's an interesting economy note: chips from the Waldrich lathe are large enough to be remelted, unlike finer chips from other lathes that oxidize too quickly. Ohio Steel Foundry collects a bonus of $15 on every ton salvaged.

Three different size Waldrich lathes are now in operation at this plant, turning workpieces with maximum O.D.'s of 36″, 48″ and 63″. Maybe one of these sizes is the answer to your roll turning needs. It's easy to find out. Write today for complete details on these heavy producers.

WALDRICH SIEGEN

american waldrich mfg. corp.

1232 PENN AVENUE, PITTSBURGH 22, PENNSYLVANIA

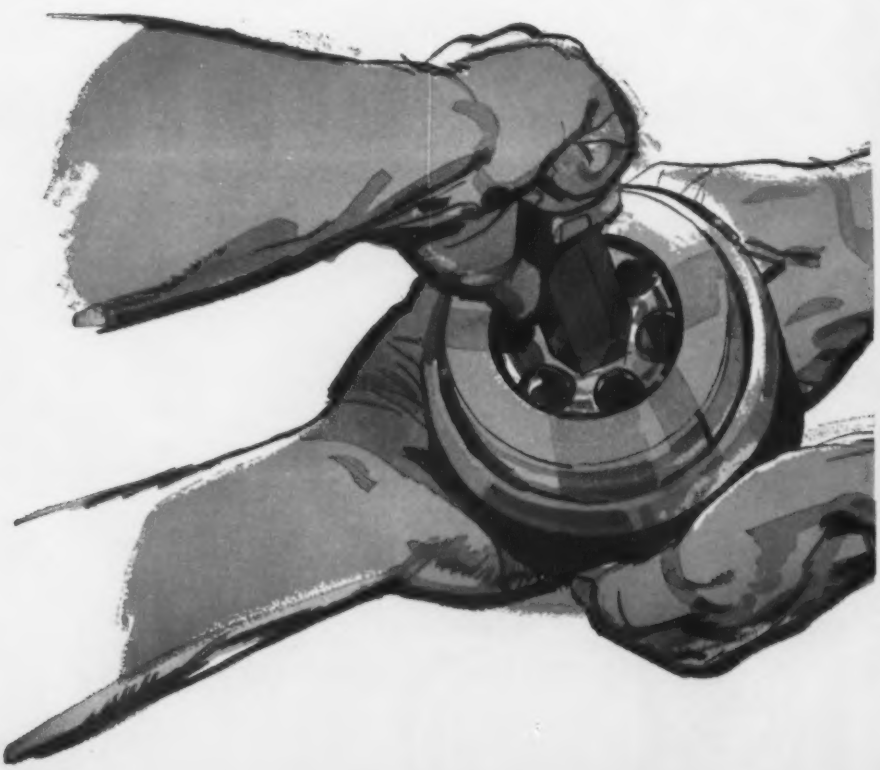
Look what

production increases

this company got with

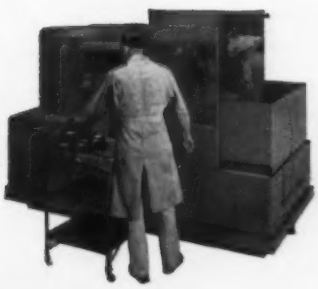
STANICOOL
HD Soluble Oil

PRODUCTION MANUFACTURING COMPANY DOUBLED NUMBER OF THREADS CUT BETWEEN CUTTER SHARPENINGS, SCORED OTHER PRODUCTION GAINS



Situation: O. C. Patterson, vice president of Production Manufacturing Company, Tulsa, wanted to cut down on the number of metalworking products used in the plant. He wanted to use just one oil for cutting SAE 1025 steel, screw stock and SAE 440 stainless steel.

Action taken: Checking with Standard Oil lubrication specialist, R. J. MacMurray, Mr. Patterson learned about STANICOOL HD Soluble Oil. A test was set up on a Warner & Swasey automatic bar machine. Roger MacMurray helped set up equipment for the test and helped work out the right STANICOOL HD and water mixtures for the types of metal used. A 4:1 mix for 1025 steel, and up to 10:1 for other metals and jobs was decided upon.



What happened: Parts were threaded on the bar machine that Production Manufacturing had previously been unable to thread. On a new Warner & Swasey AC chucker, it was found STANICOOL made possible threading at a speed of 35 surface feet per minute. With STANICOOL HD 150 threads could be cut before the cutter needs to be sharpened. Only 75 threads could be cut before. Plant management found STANICOOL also protected work from rust while it went through many additional shop operations.

To find out more: All the facts about STANICOOL HD Soluble Oil are yours. Just call your nearby Standard Oil lubrication specialist in any of the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 S. Michigan Ave., Chicago 80, Illinois.**

No trouble. Pressure coupling is checked by O. C. Patterson, vice president of Production Manufacturing, Standard Oil's Roger MacMurray and foreman Byron Finley. Roger MacMurray helped the men in this plant find a new route to production increases with STANICOOL HD Soluble Oil. That's his job, and he's well equipped for it. Eight years' experience in such work, an engineering degree from the University of Colorado and completion of the Standard Oil Sales Engineering School are his qualifications.

Quick facts about

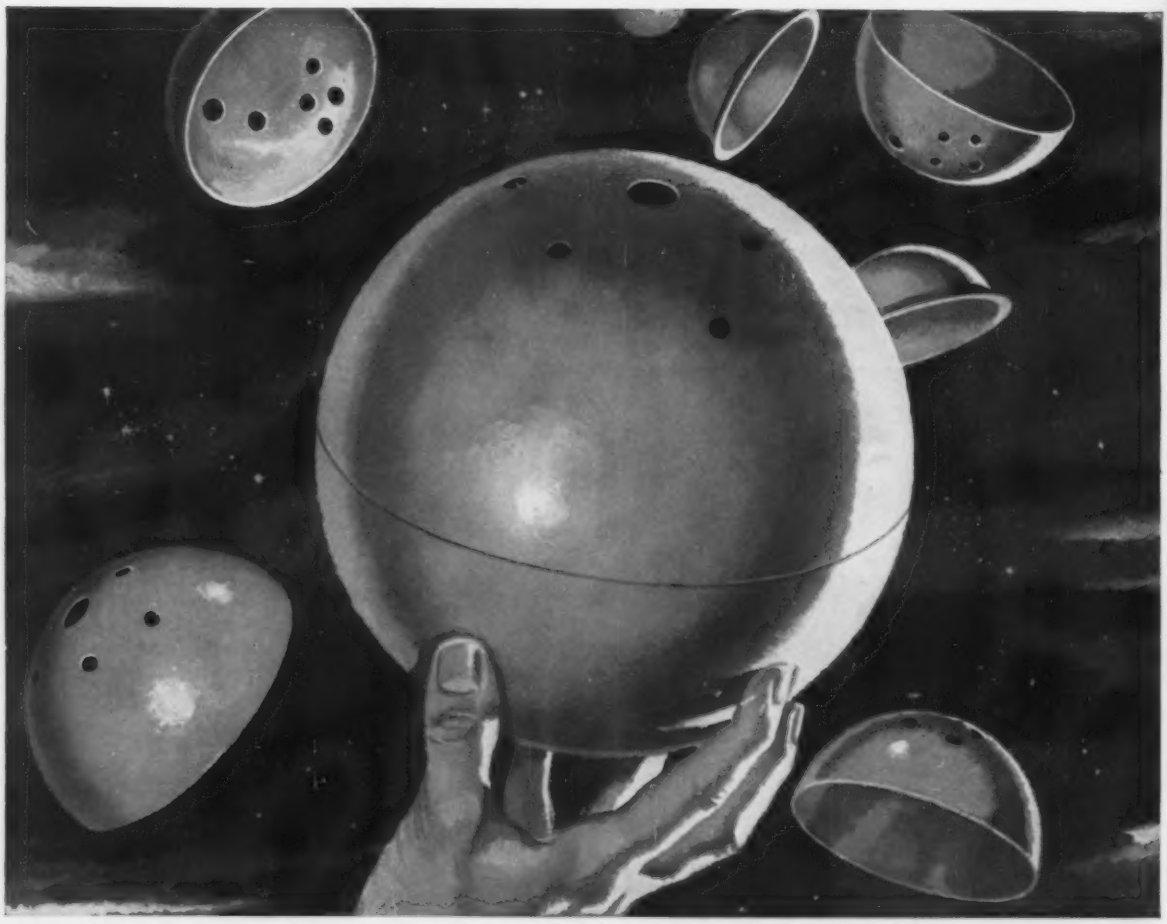
STANICOOL HD Soluble Oil

- Has E. P. and oiliness properties comparable to cutting oil.
- Contains germicide that controls bacteria build-up.
- Is nonirritating to skin.
- Protects machines, tools and work against rust and gumming.
- Will not gel in cold weather, has excellent emulsion stability.

You expect more from STANDARD and get it!

Problem-Solving Products from Republic

SAVE WEIGHT, FIGHT CORROSION, ADD STRENGTH AND TOUGHNESS



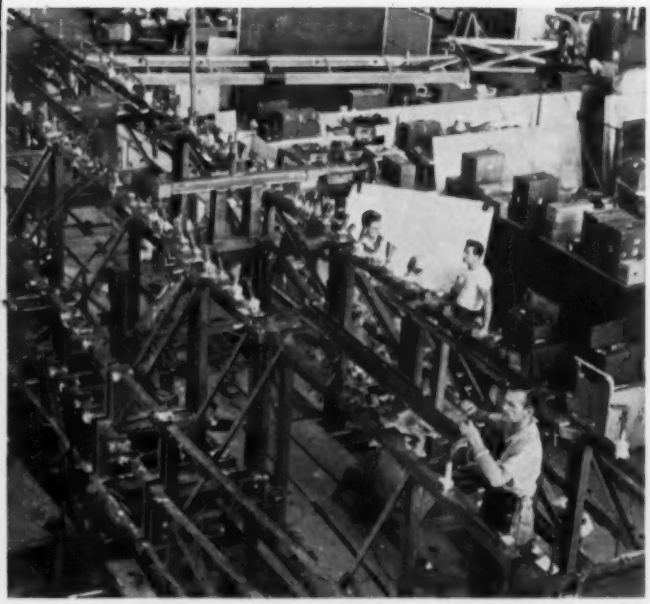
TITANIUM HEMISPHERES ARE STRONG, LIGHTWEIGHT, DEFY CORROSION BELOW −150°C. They are used in highly specialized aeronautical applications calling for high strength, light weight, and resistance to the severe corrosive action of liquefied gases at severe sub-zero temperatures.

Alloy Products Corporation, Waukesha, Wisconsin, utilizes three major advantages of commercially pure Republic Titanium, Type RS-70, in meeting these requirements:

1. Titanium reduces weight without sacrifice of strength or safety. In fact, titanium offers the highest strength-to-weight ratio of construction materials.
2. This exceptionally high-strength property enables this product to withstand burst pressures in excess of 2,000 lbs. psi.
3. Titanium's extremely high corrosion-resistant properties defy the corrosive action to which the units are constantly exposed.

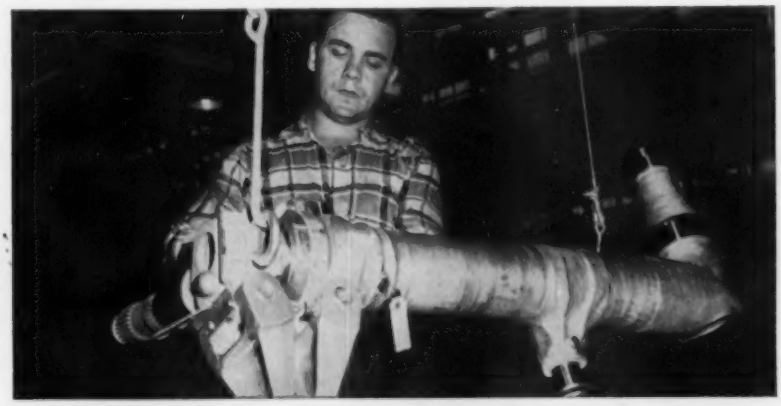
The entire fabricating operation is performed without difficulty and with little change in procedure as compared to other materials. Fabricating steps include drawing, trimming, piercing, extruding, and welding.

Does this application of Republic Titanium generate an idea for your product that needs to be strong, lightweight and corrosion-resistant? Republic Metallurgists are ready to help you apply titanium's advantages now. This service is confidential and without obligation. Mail coupon today for more information.



STRENGTH AND SAFETY IN MISSILE jig and fixture assemblies is provided by 4" x 4" square carbon steel mechanical tubing. It is used because of its greater strength-to-weight ratio in structural applications. Elimination of accident-causing sharp edges adds to the safety margin. Republic Steel and Tubes Engineers will help you design ELECTRUNITE Mechanical Tubing into your product to speed production, cut costs, save weight, improve product performance. Mail coupon.

TOUGHNESS, HIGH STRENGTH-TO-WEIGHT RATIO, resistance to heat and corrosion are advantages of ENDURO Stainless Steel designed into both structural and operating parts of supersonic Convair F-102A. ENDURO is made for flight in both military and civilian aircraft. Its outstanding combination of properties offers almost unlimited freedom in design and application. Republic will help you apply it to best advantage. Write us.



MAXIMUM RESISTANCE TO FATIGUE, strength and toughness are provided by Republic Alloy Steel in landing-gear struts of North American's F-100. The struts are made by Bendix Aviation Corporation. Bendix and Republic metallurgists, working closely with North American engineers, developed a new grade of alloy steel to meet exacting requirements of the strut's inner and outer cylinders. It has a strength range of 220,000—240,000 psi and maintains this great strength at wide temperature extremes. Republic Alloy Metallurgists are available to help with your projects.

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World's Widest Range of Standard Steels and Steel Products

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Have a metallurgist call. ☐ Titanium ☐ Stainless ☐ Alloy

Send more information on:

☐ Titanium ☐ Stainless Steel
☐ Mechanical Tubing ☐ Alloy Steel

Name _____ Title _____

Company _____

Address _____

City _____ Zone ____ State _____

Here's a NEW WELDING TORCH that's WATERTIGHT... built for HEAVY-DUTY SERVICE ...yet weighs only 7 OUNCES!

This new HELIARC HW-18 Hand Welding Torch weighs only 7 ounces, making it easy for you to handle, less tiring. The special one-piece water cooling channel eliminates sources of leakage. And it's made for rugged, heavy-duty service.

YOU GET BETTER SHIELDING WITH LESS GAS

Improved design of collet body and closer electrode fit assure uniform argon flow, without jetting or turbulence.

GIVES YOU RUGGED SERVICE

Torch body is Fiberglas-reinforced phenolic for greater resistance to heat and thermal shock. Handle is tough, polished plastic. Gas cups have 4 times the impact strength of ordinary cups.

LEAKPROOF

Molded, one-piece water cooling passage has no joints to permit leakage—no water drip to contaminate welds.

◀ Diagram shows leakproof, one-piece water cooling passage in LINDE's new HELIARC HW-18 Hand Welding Torch.

EASY, MORE ECONOMICAL MAINTENANCE

Collets, collet bodies, cups and caps are interchangeable with those of your HW-17 Series 2 Torch. All couplings have standard IAA connections, and adaptors are included. Your production costs are lowered, too, for the new HW-18 saves time in hard-to-reach spots. Torch is designed for continuous 300-amp service, a-c or d-c.

ARGON SHUT-OFF VALVE

(Optional) saves time, steps and argon.

See and try this new HELIARC HW-18 Torch! For a demonstration, mail coupon today. Or call your distributor or nearest LINDE office. LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in other principal cities. In Canada: Linde Company, Division of Union Carbide Canada Limited.

Dept. I-34, LINDE COMPANY, Division of UCC
30 East 42nd Street, New York 17, N. Y.

Please advise me where and when I can examine and try out the new HELIARC HW-18 Hand Welding Torch.

NAME_____

COMPANY_____

STREET_____

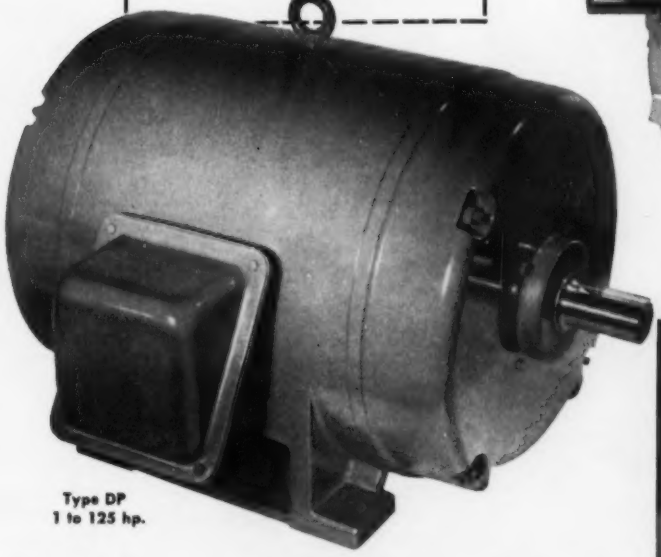
CITY_____ ZONE____ STATE_____

FOR THE BEST IN ELECTRIC WELDING LOOK TO *Linde* TRADE-MARK

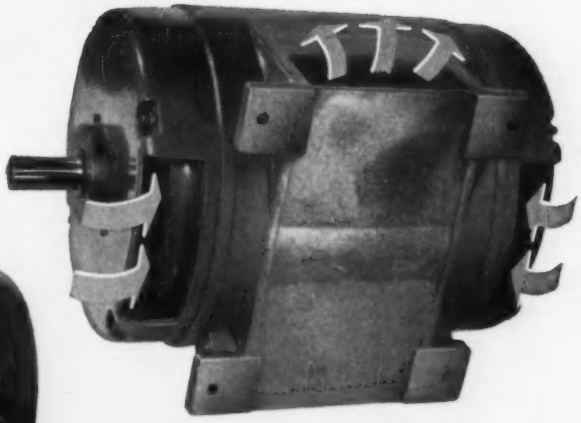
UNION CARBIDE

The terms "Linde," "Heliarc," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

WAGNER
POLYPHASE
MOTORS



Type DP
1 to 125 hp.



These open type motors give DOUBLE PROTECTION... can be used in many places that formerly required splashproof motors

Wagner Type DP Motors offer the *double protection* of rugged corrosion-resistant cast iron frames and dripproof enclosures so well designed that the DP Motor can handle many applications that formerly required splashproof motors.

These Wagner Motors are built in the new NEMA ratings that pack more power into less space, are lighter in weight and are easier to maintain—only occasional lubrication is required.

SLEEVE BEARING MODELS AVAILABLE

The entire line of ratings through 125 hp. is available with steel-backed, babbitt lined sleeve bearings that have high carrying capacity and provide quieter operation.

Let a Wagner Sales Engineer show you how these motors can be applied to your needs. Call the nearest branch office or write for Wagner Bulletin MU-223.

1 to 125 HP—1750 RPM—40°C NEMA FRAMES 182 through 445U

Wagner Electric Corporation
6403 Plymouth Ave., St. Louis 14, Mo., U.S.A.

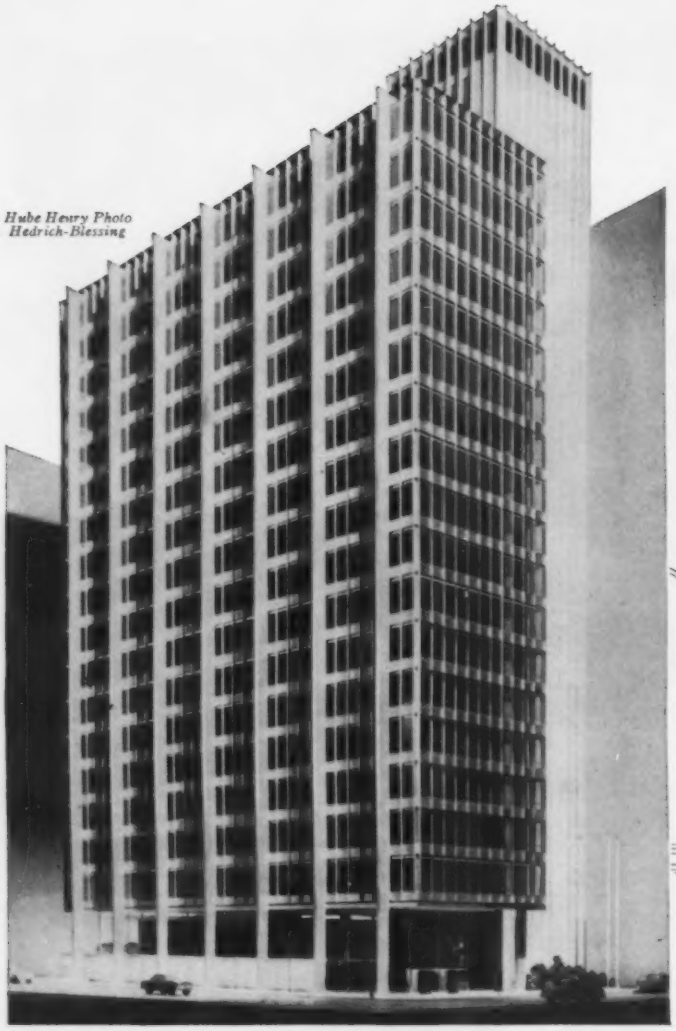
VH384

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

DOUBLY PROTECTED — Wagner DP Motors offer the *double protection* of completely dripproof enclosures and rugged cast iron frames that can take rough handling and resist corrosion.

CAN BE RELUBRICATED — These motors can be re-greased when desired for longer bearing life. Fresh grease can be added—old grease removed—through openings provided in the ball bearing housing.

COOL RUNNING — Specially designed baffles direct cooling air through the motor to protect the stator windings. Blowers, cast as part of the rotor, move large volumes of air without noise or vibration.



Hube Henry Photo
Hedrich-Blessing

Skidmore, Owings and Merrill—*Architects*...Turner Construction Co.—*Gen. Contractor*

FIRST BUILDING TO USE THE NICKEL-SAVING ALLEGHENY-PIONEERED STAINLESS STEEL (TYPE 202)

The Inland Steel Company's new headquarters in Chicago numbers some important firsts among its outstanding features. It is the first large office building to be built in Chicago's loop in 20 years. It is also Chicago's first stainless curtain wall building, and the first building anywhere to use the low-nickel stainless grades pioneered by Allegheny Ludlum.

Allegheny 200-series stainless steels (Types 201 and 202) are the answer to one of the knottiest problems that have faced architects and designers who want to use the superior durability, strength and beauty inherent in stainless steel. Now, with the 200-series it is possible to think in terms of stainless steel without fear of future shortages. That is always an important consideration, and especially so with mass-produced items.

In most applications the 200-series perform as well as the 300-series of stainless steels, and they offer unique advantages of their own. There is some advantage in price, strength is slightly higher and availability is much greater in times of nickel shortage. Weldability, forming and finishing characteristics are virtually the same as with the 300-series.

If these new steels sound interesting to you, let us supply printed information and engineering assistance. ● Write for a copy of *Technical Horizons No. TH2*, containing essential data on the properties and characteristics of Allegheny 200-series low nickel stainless steels. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.***

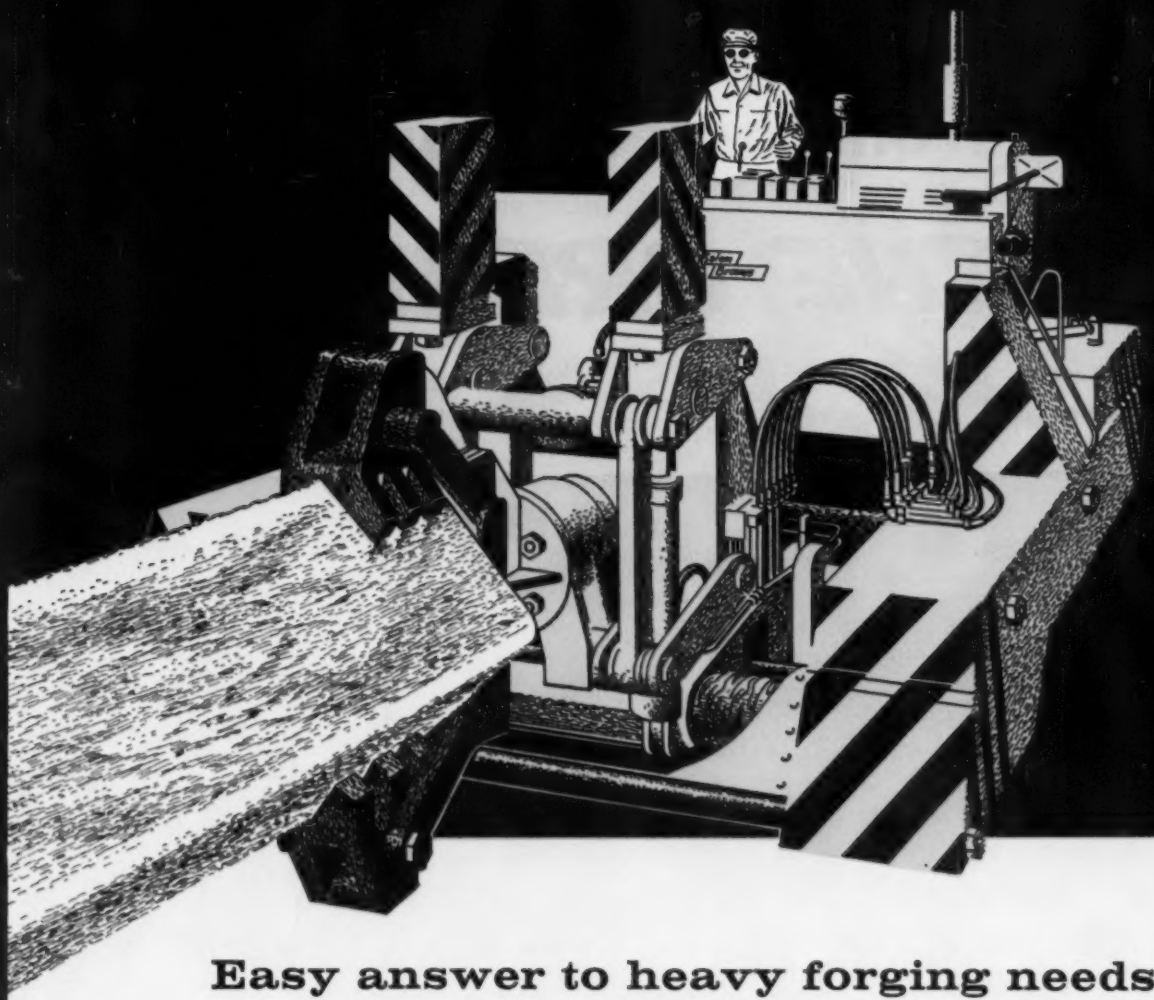
ADDRESS DEPT. A-3A

WSW 6673 A

Make it BETTER and LONGER LASTING with Stainless from

ALLEGHENY LUDLUM

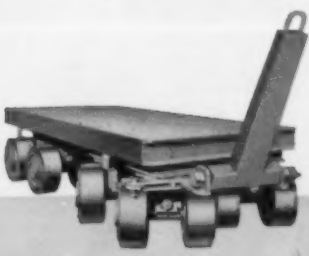
Warehouse stocks carried by all Ryerson steel plants



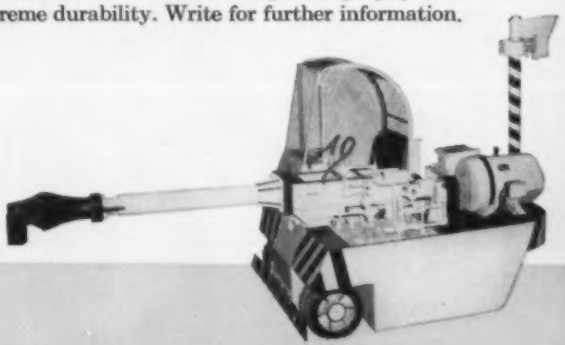
Easy answer to heavy forging needs

The free-moving Salem-Brosius rubber-tired manipulator adds speed, safety and economy to open-die forging. At hammer or press it raises, lowers, tilts, rotates or laterally moves the hot stock, satisfying forge manipulating requirements. Also, it can charge or draw forge shop furnaces, operating with the facility of a fork-lift truck in hot or cold stock handling. The Salem-Brosius Manipulator saves floor space. It travels to furnaces and presses or hammers without freezing floor space with tracks or overhead areas with craneways.

This ruggedly-built machine meets the trend of industry toward hammer and press forging of high alloy, stainless and tool steels, and the many new extremely hard refractory-type alloys. The forging of these metals necessitates manipulating equipment of extreme durability. Write for further information.



Two other prominent members of the Salem-Brosius family of materials handling equipment are heavy-duty in-plant trailers (left) and the exclusive rubber-tired type furnace chargers shown at the right. Ask about them when you inquire about the manipulator.



SALEM-BROSIUS, INC.

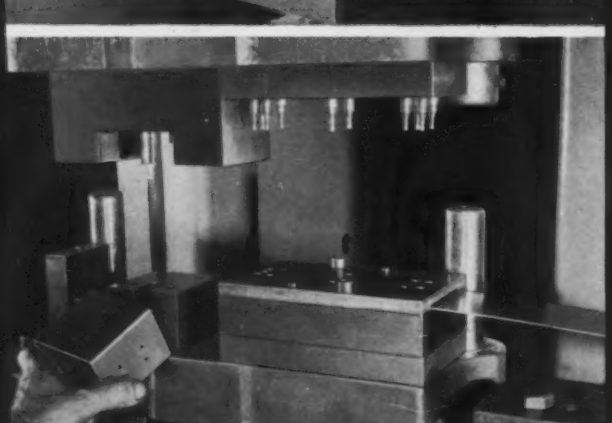
CARNEGIE, PENNSYLVANIA

In Canada: Salem Engineering Limited • 1525 Bloor Street West, Toronto 9, Ontario

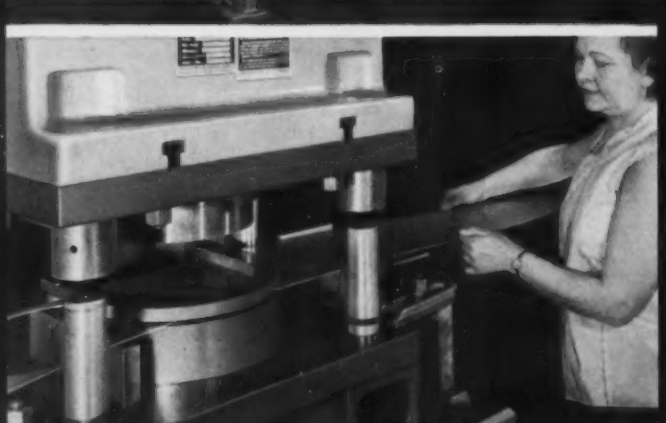
SPECIAL MECHANICAL EQUIPMENT • INDUSTRIAL HEATING FURNACES • MATERIALS HANDLING EQUIPMENT

Take it from the early birds...

"IT'S THE GREATEST



Niagara Series E 4½ OBI Press in operation at a well known eastern commercial stamping plant. Work includes stamping small wrenches; trimming canopies for electrical fixtures; piercing, cutting off and forming saddles with a progressive die (shown).



Niagara Series E 4½ OBI Press engaged in blanking and drawing of kitchen cannister lids from half-hard aluminum at midwestern housewares manufacturing plant.

"we can produce from 8,000 to 10,000 pieces in an eight hour day"

"much safer press"

"takes less floor space"

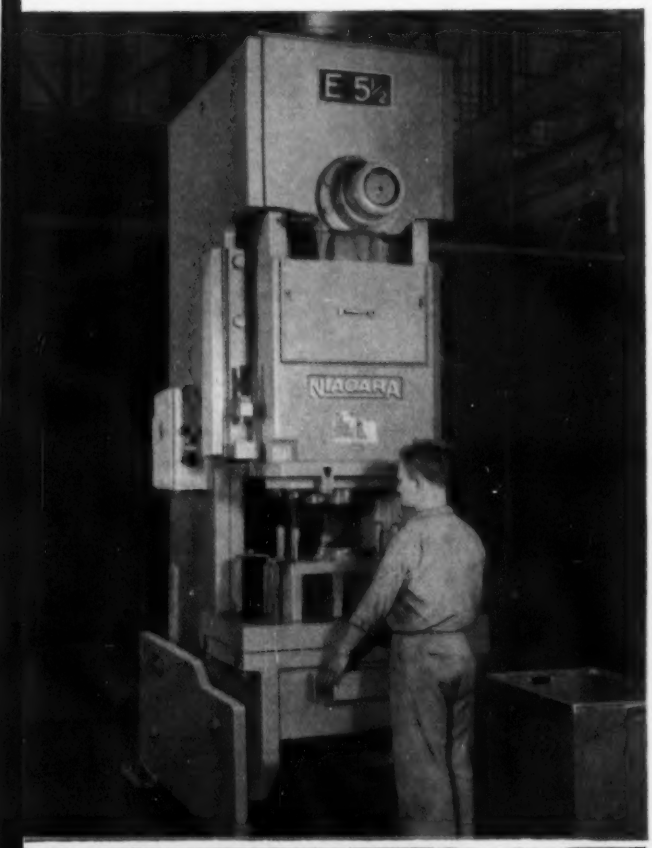
"has a centralized pressure lubricator which we like very much"

O.B.I. EVER BUILT"

"we find that dies without posts work much better on this press"

"all dies give better and longer runs"

"large slide area for large trimming, blanking and progressive dies"



Niagara Series E 5½ OBI Press forming and trimming hemispherical copper parts for one of the "Big Two" electrical manufacturers.

Few developments in metalworking history have drawn the enthusiastic endorsement given Niagara's revolutionary Front-to-Back Crankshaft OBI Press.

Now, as at the 1955 Machine Tool Show where it was unveiled, there is *nothing* even remotely resembling it in the industry... design-wise and production-wise.

Customers in U.S. and Canada... the "early birds" who are doing their modernizing with the most modern press of all... can today tell you about accomplishments with this newest and greatest of OBIs that you would have never dreamed possible. Yes, the press that Niagara conceived to do more than any OBI ever built is doing just that for a fast-growing list of metalworking plants.

There's a huge fund of successful experiences that a Niagara representative can share with you today. Draw on it now and utilize it in your modernization plans. Make a date, at your convenience, for a personal call.

...and if you haven't received new Bulletin 56 with complete design description and specifications (75-200 ton capacities, 4½-7½ inch shaft diameters, standard and automated models), write for your copy at once. You will find it invaluable to your planning.

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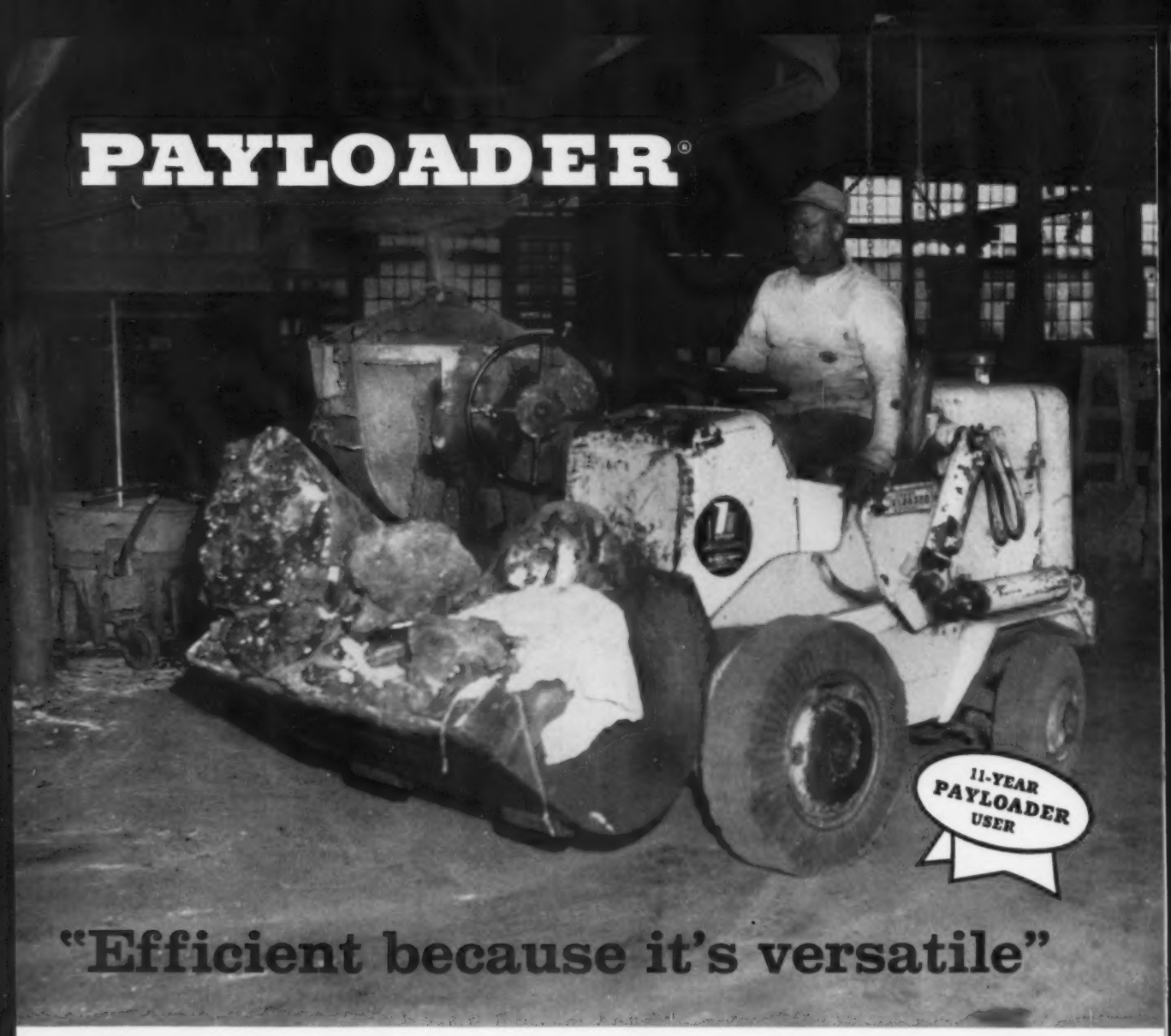
America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work

NIAGARA

front-to-back crankshaft INCLINABLE PRESSES

PAYLOADER®



"Efficient because it's versatile"

Unloads all incoming sand, feeds molding stations, cleans up and loads out cupola slag and cleans up foundry floors at Richmond Foundry & Mfg. Co., Inc., Richmond, Va.

"Model HA 'PAYLOADER' tractor-shovels are efficient in our foundry operations because of their versatility alone," says Donald A. Matthieu of Richmond.

We have bought 4 since 1947 and have 3 in daily operation. They have proven very satisfactory and very economical, giving us ideal control of our sand-handling operations and every-day labor-saving."

Foundries of all kinds — big and little — gray iron, steel, malleable and non-ferrous have been joining the ranks of "PAYLOADER" users and boosters for 12 years. And today's Model HA "PAYLOADER" is a vast improvement over yesterday's — in productive capacity, digging ability, carrying capacity, carrying speed, in operator ease and safety and in lower maintenance.

Your Hough Distributor wants to demonstrate what a Model HA "PAYLOADER" can do in *your* foundry. Ask him about Hough Purchase and Lease Plans too.

THE FRANK G. HOUGH CO.
733 Sunnyside Ave., Libertyville, Ill.

Please send "PAYLOADER" information:
- ☐ Model HA (2,000 lbs. carry cap.)
- ☐ Model HAH (3,000 lbs. carry cap.)
- ☐ Attachments for scrap handling

Name.....

Title.....

Company.....

Street.....

City.....State.....

3-A-2

SAY "HUFF"

Modern Materials Handling Equipment

THE FRANK G. HOUGH CO.

LIBERTYVILLE, ILLINOIS

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

NOW THAT WE'RE "Automated" you get SUPER FAST Delivery!

Enclosed freight car loading of kegs and cartons containing many different kinds of fasteners. If you prefer truck shipment, Lamson has a 10-truck enclosed loading dock, too.

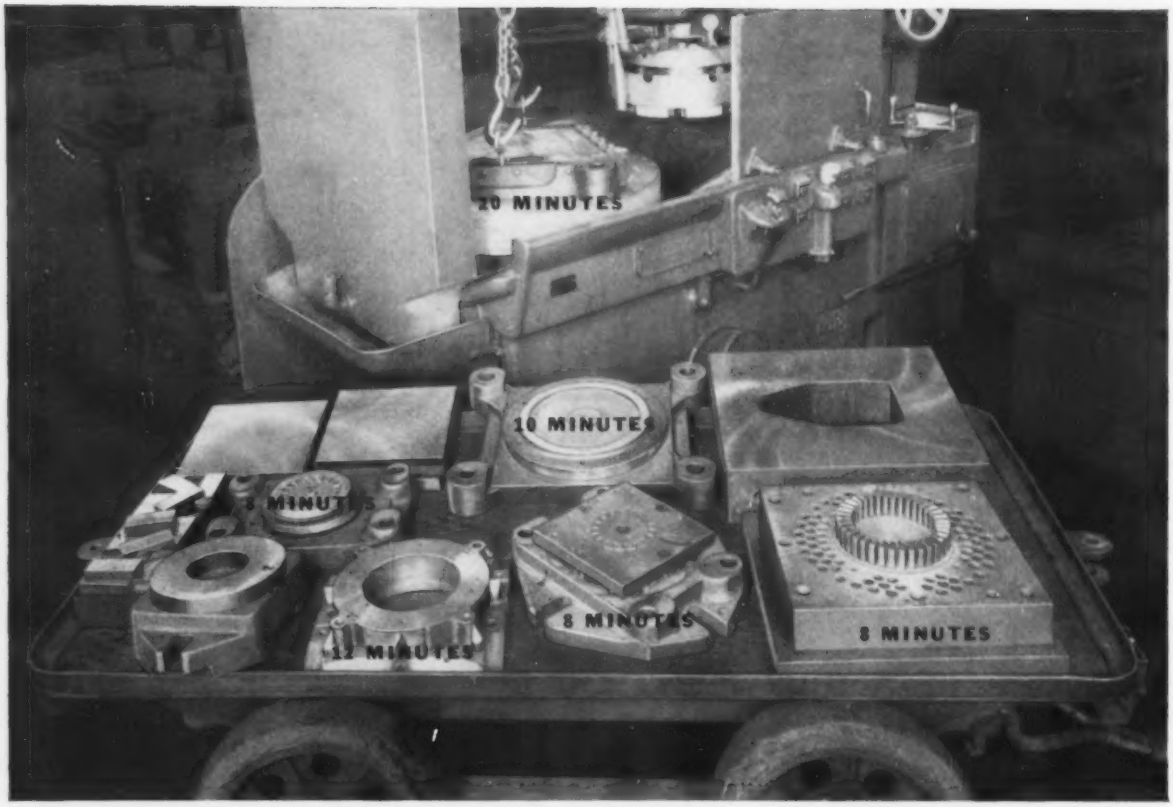
By the carton, case, keg or carload . . . no matter how you buy fasteners, Lamson & Sessions now gives immediate delivery on most standard fastener products.

The streamlined operations in our new plants have speeded up both production and delivery so we can now be there with "the mostest, fastest"!

As manufacturers of *the most complete line* in the bolt and nut industry, chances are we can fill your order from stock *right now!* Try us and see.

The LAMSON & SESSIONS Co.

5000 TIEDEMAN ROAD, CLEVELAND 9, OHIO • PLANTS AT CLEVELAND AND KENT, OHIO • CHICAGO • BIRMINGHAM



The *EASIEST, FASTEST and CHEAPEST WAY* TO SHARPEN A DIE is to... *PUT IT ON A BLANCHARD!*

The Blanchard method of die sharpening is unequalled for speed, safety and economy. All of the dies shown are sharpened on a Blanchard No. 18 Surface Grinder with equal ease.

The rotary work motion of the Blanchard, with the wheel covering the entire surface at each revolution, enables the operator to remove the amount of stock to sharpen the die and no more! This saves time and increases the life of the die, too.

The ample supply of coolant and the ability to use free-cutting wheels permit high grinding speeds without danger of burning the work. This extra speed reduces idle time on the presses.

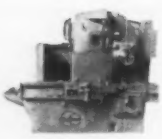
Many shops use their Blanchards for die sharpening as well as all other surface grinding required in their manufacturing. The 3 Blanchards shown below cover work requirements from finishing tiny gears to roughing steel plates 84" across corners.

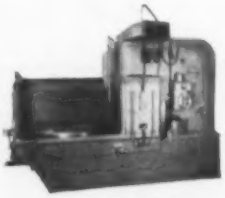
Write today for your free copy of WORK DONE ON THE BLANCHARD, Fifth Edition and "the Art of Grinding", Fourth Edition.

BLANCHARD

THE BLANCHARD MACHINE COMPANY
64 State Street, Cambridge, Massachusetts, U. S. A.

No. 11


No. 18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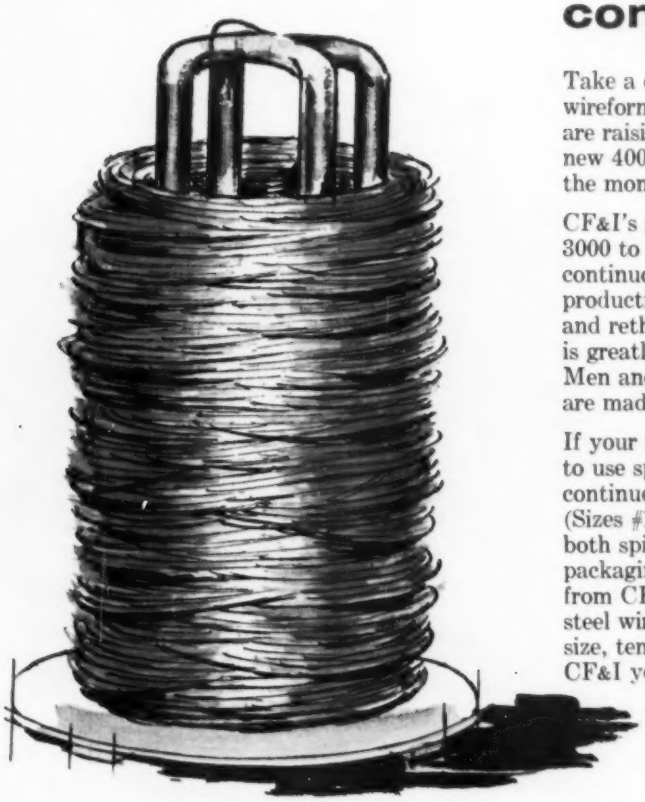
for longer runs and lower costs

buy CF&I WIRE

in 3000-4000 lb. continuous lengths

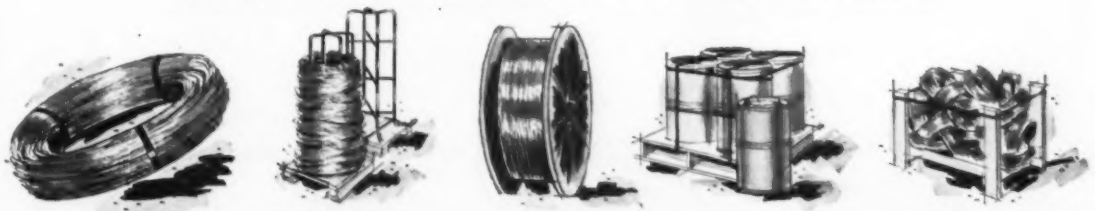


Take a cost-conscious look at your wireforming operation. If short length coils are raising costs and cutting profits, CF&I's new 4000-lb. "spider" package may provide the money-saving answer to your problem.

CF&I's returnable "spiders" carry from 3000 to 4000 lbs. of wire in a single continuous length. They can increase production because downtime to stop, reload and rethread your wireworking machines is greatly reduced. Scrap losses are minimized. Men and materials handling equipment are made available for other work.

If your manufacturing process is not equipped to use spiders, order our 200-2000 lb. continuous-length steel-strapped wire coils. (Sizes #13 AWG and coarser apply for both spider and coils.) Other standard packaging methods are, of course, available from CF&I. For high or low carbon steel wire; round, flat or shaped; in any size, temper, grade or finish, make CF&I your source of supply.

OTHER CF&I STANDARD PACKAGING METHODS



Steel strapped coils (200-2000 lbs.)

Non-returnable spiders (500-700 lbs. capacity)

Reels (500-800 lbs. capacity)

Pay-off paks

Steel strapped wooden rack

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

6018

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) Oklahoma City • Phoenix • Pueblo • Salt Lake City • Wichita • **PACIFIC COAST DIVISION**—Los Angeles • Oakland • Portland • San Francisco • San Leandro • Seattle • Spokane **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia • **CF&I OFFICES IN CANADA:** Montreal • Toronto **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg

YOUNGSTOWN SHEETS AND STRIP

Speed-Up Toughest Deep-Drawing Operations

Photo and Drawing courtesy of Hydraulic Press Mfg. Co.

Modern high-speed precision drawing and stamping operations require only the highest quality steel if top production - low reject rates are to be maintained on difficult-to-run parts. And the highest quality steel produced anywhere is Youngstown Sheets and Strip.

Our satisfied customers, across the nation, tell us time and time again: "Our production is increasing—Rejects falling off—Fabrication costs are down." Why not make Youngstown your regular sheet and strip specification from now on—for improving both product quality and the overall profit picture.

When you use Youngstown Sheets and Strip you can be sure metallurgical quality will never vary because they are produced by steelmakers—with over 56 years experience—using only the most scientific quality control techniques. This guarantees a proper blending of the required ductility, tensile strength, flatness and surface to meet your exact specifications.

Why not call or write your nearest Youngstown District Office, today, for metallurgical assistance or additional information—or write directly to our Home Office.

QUALITY YOUNGSTOWN SERVICE

COLD ROLLED SHEETS AND STRIP

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio

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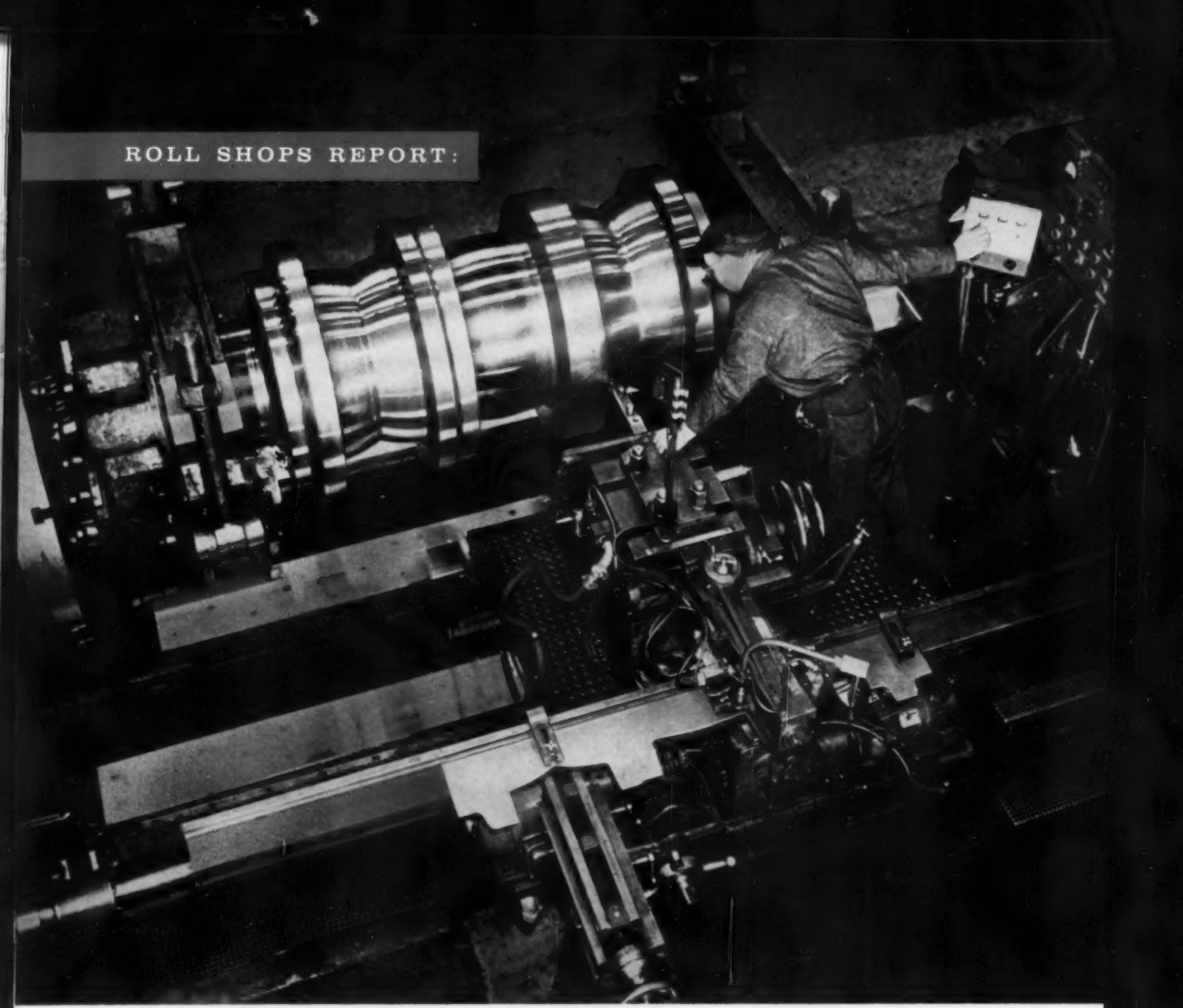


"The skill's built in...and it does the work of three!"

What are your most urgent roll problems? A growing work load...high roll turning costs . . . a shrinking supply of skilled roll turners? *If that's the case, you're no different from 90 per cent of steel mill roll shops.*

Mack-Hemp Automatic Contouring lathes solve these problems for you. They reduce turning time by taking off more metal in one hour than a roll turner can in three or four on a block lathe. Yet Mack-Hemp lathes accurately reproduce within 0.001-inch complicated roll patterns from ful-size templates by means of an electronic "pilot."

That's why many leading steel mill roll shops are using Mack-Hemp contouring lathes and why a number of others have ordered them.

To find out how these lathes can help you, drop us a line today.

MACKINTOSH-HEMPHILL
Division of E. W. BLISS Company
Pittsburgh and Midland, Pa.

MACKINTOSH-HEMPHILL DIVISION · PITTSBURGH, U.S.A. · BLISS

WORLD'S LARGEST

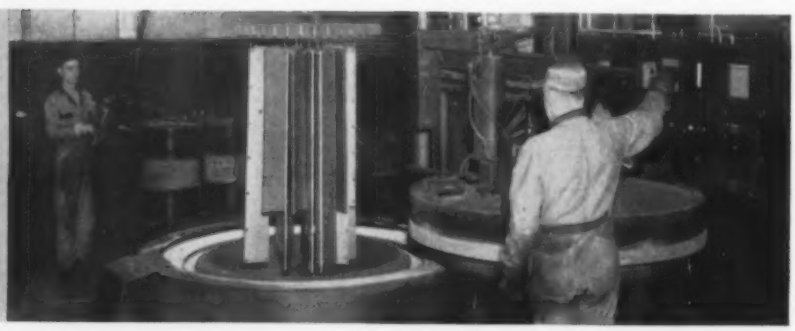
Gas-Fired Homocarb® Furnace Installed

"This equipment took a sizable bite out of our limited expansion capital," says Carl H. Muehlemeyer, President of O. T. Muehlemeyer Heat Treating Company, commercial heat treaters in Rockford, Ill., "but we chose it deliberately after much consideration because we know that with it, we can give our customers the quality and service they require at a competitive cost."

Muehlemeyer points out that, "This furnace is part of a quality-control expansion program extending over the next several years. It reached us from Leeds & Northrup ready for installation with complete instrumentation for Speedomax temperature control and Microcarb atmosphere control."

Only recently has a complete line of gas-fired Homocarb furnaces, equivalent in design, construction and instrumentation to electrically-fired units been introduced. Combining precision control of carbon potential with the economy of gas-firing, these furnaces can be used interchangeably for case carburizing, carbon restoration, homogeneous carburizing or hardening. These factors strongly influenced Muehlemeyer's choice.

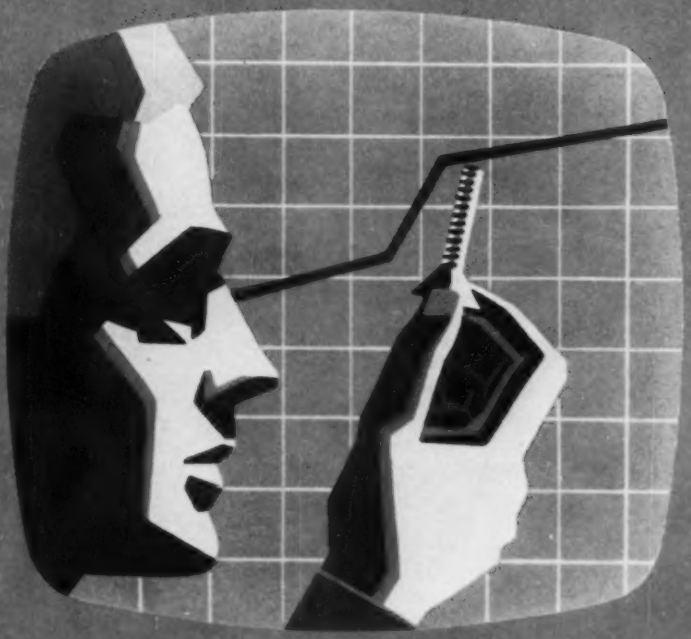
A load of SAE 4140 steel slidebars being unloaded from Muehlemeyer's gas-fired furnace. Carbon and temperature control panels can be seen at right. Above is the same furnace . . . measuring 15 feet high by 6½ feet in diameter . . . ready to leave the L&N shipping dock in Philadelphia.



For more information *just write us at 4956 Stenton Ave., Phila. 44, Pa.*

LEEDS *instruments* **NORTHRUP** *automatic controls • furnaces*

This membership seal means



consistent good quality in PHILLIPS CROSS-RECESSED HEAD SCREWS

Manufacturers of Phillips Cross-Recessed Head Screws who are entitled to the above seal do a good deal more than compete in selling these famous fasteners. They share quality control methods that bring worthwhile advantages to your assembly operations.

Consistent good quality fasteners for your product from these reliable sources are assured by common adherence to precision accuracy of dimensional standards, inspection gauges and gauging methods established by the Phillips Cross-Recessed Head Standards Committee sponsored by Screw Research Association.

You can rely upon these sources for product reliability which assures correct mating fit between recess and driving point. This eliminates driver slippage and prolongs driver and bit life, improves product appearance and reduces your costs.

Members of Screw Research Association...

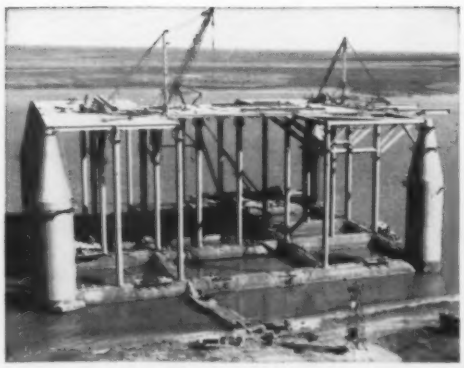
You can rely on these sources . . . for product reliability

American Screw Company • Atlantic Screw Works, Inc. • The Blake & Johnson Co. • Central Screw Company • Continental Screw Co. • Elco Tool and Screw Corporation • Great Lakes Screw Corp. • The H. M. Harper Company • The Lamson & Sessions Company • National Lock Company • The National Screw & Manufacturing Company • Parker-Kalon Division, General American Transportation Corporation • Pheoll Manufacturing Co. • The Progressive Manufacturing Company Division, The Torrington Company • Scovill Manufacturing Company • Shakeproof Division Illinois Tool Works • The Southington Hdwe. Mfg. Company Sterling Bolt Company • Universal Screw Company • Wales-Beech Corporation

When you buy from U. S. Steel

STEEL + PLUS IN ACTION: FACILITIES

This offshore drilling rig weighs in at *8 million pounds.* It was designed by the owner, Kerr McGee Industries, and is 100' high, 242' long, 202' wide—the twin of the world's largest ocean-going drilling barge. Despite the size of this monster rig, our American Bridge Division built it in just *two pieces,* using our extra-wide 120-foot marine ways at Orange, Texas—a good example of the unexcelled steel facilities you can count on at United States Steel.



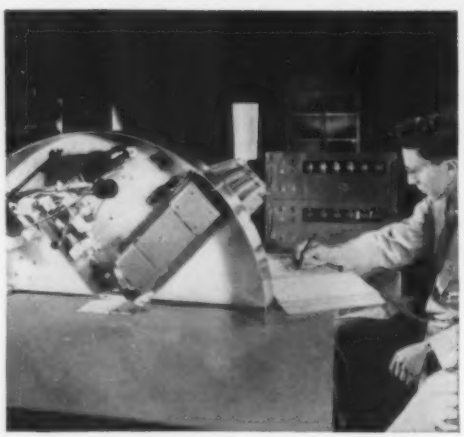
STEEL + PLUS IN ACTION: MARKETING ASSISTANCE

At United States Steel, we spend a lot of time trying to sell our *customers'* products. For example, this picture was taken at the Chemical Industries Exposition. The United States Steel exhibit explained the many advantages of Stainless Steel chemical equipment made by our customers. Result: our customers sell more equipment because our promotional activities help to *pre-sell* products made of USS steels.

STEEL + PLUS IN ACTION: RESEARCH

U. S. Steel has an unusual X-ray gage that measures the thickness of tin on tinplate. The X-rays penetrate the tin coating, causing the iron atoms in the steel *base* to fluoresce and emit X-rays of their own. As these new X-rays emerge from the base, they are partially absorbed by the tin coating as they pass through. This absorption is measured with a Geiger counter, which tells us how thick the tin coating is.

USS is a registered trademark



American Bridge • American Steel & Wire and Cyclone Fence • Columbia-Geneva Steel • Consolidated Western Steel • National Tube • Oil Well Supply Tennessee Coal & Iron • United States Steel Homes • United States Steel Products • United States Steel Supply and Gerrard Steel Strapping United States Steel Export Company • Universal Atlas Cement Company

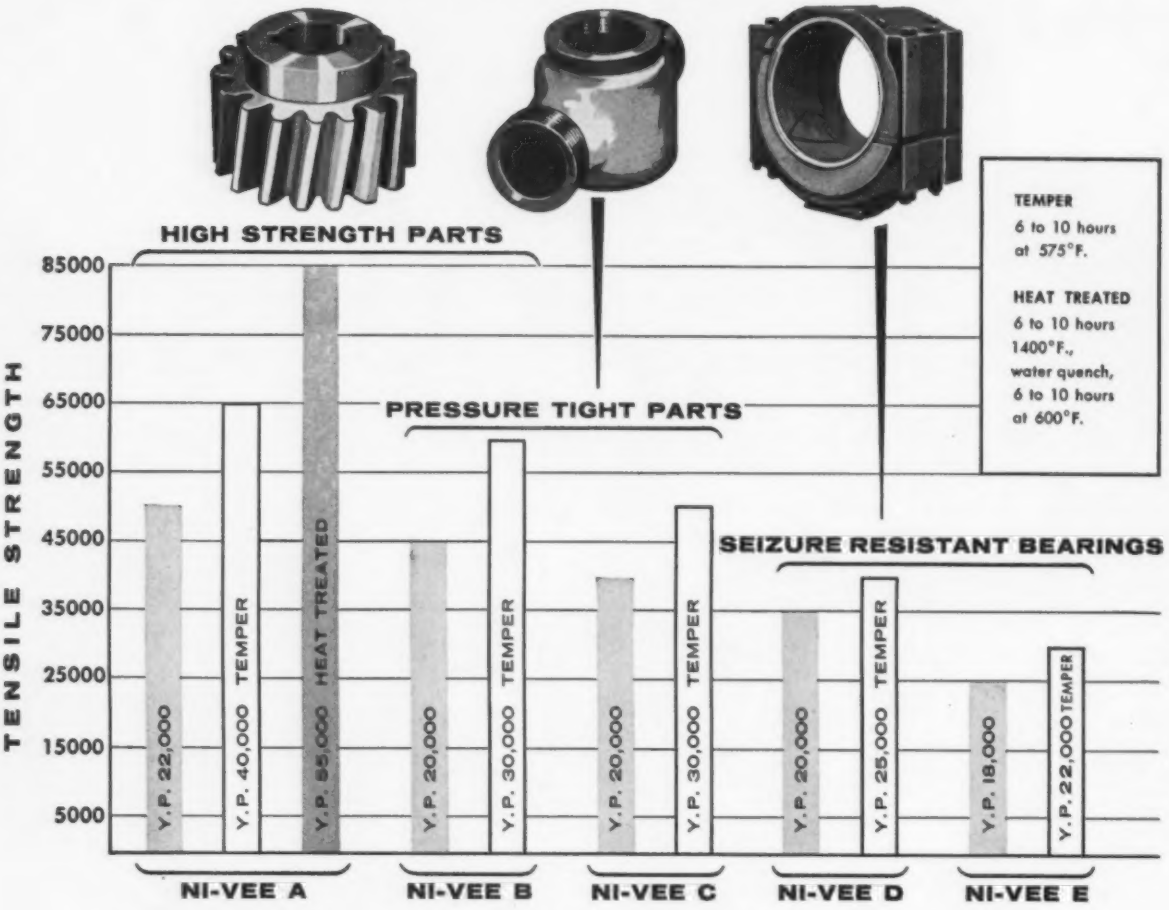
you get STEEL + PLUS

STEEL + PLUS IN ACTION: TECHNICAL ASSISTANCE

One of Amerock Corporation's hardware products is a window sash lift, and it became necessary for them to substitute a less expensive metal in its manufacture. They needed a metal soft enough to take the extremely deep draw yet hard enough to retain a finish suitable for plating. Metallurgists from American Steel & Wire Division suggested a special cold rolled strip steel that solved the problem where all others had failed.

USS **United States Steel**

TYPICAL NI-VEE BRONZE PROPERTIES



5 high-performance bronzes

These versatile Ni-Vee alloys provide a range of properties that satisfies the requirements of most copper-base castings

The chart shows the range of tensile properties of the five Ni-Vee* bronzes and indicates the types of castings made with these alloys.

As you can see, you can satisfy the majority of your specifications for quality copper-base castings from among these five versatile Ni-Vee materials. Their "As Cast" mechanical properties – especially yield strength—surpass those of comparable G and leaded bronzes and red brasses.

The chart also shows what simple heat treatment does to step up their properties. Bear in mind that values taken from the chart are typical. In practice, higher values can be obtained.

Ni-Vee extras

You can expect superior performance from all five Ni-Vee bronzes. For example. Ni-Vee B, C, D, and E (the leaded group) can be used for castings of all three classifications shown. Ni-Vee A provides extreme strength. Ni-Vee E gives you extreme resistance against galling or seizure. The low zinc group (Ni-Vee A, B, D and E) show little tendency to dezincify, insure top-notch resistance to stress corrosion. All five, of course, have the excellent general corrosion resistance of copper reinforced by a 5% nickel 5% tin content.

Helpful booklet gives complete information on Ni-Vee bronzes

"Engineering Properties and Applications of Ni-Vee Bronzes" covers tables of composition, charts on deformation, friction, fatigue, elevated temperature service, electrical resistivity, wear and other engineering data. Write for your copy today.

*Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street INCO New York 5, N. Y.

NI-VEE BRONZES
NICKEL ALLOYS PERFORM BETTER LONGER

auxiliary equipment *for* ELECTRIC WELD PIPE MILL

All Auxiliary Equipment by "YF&M" except Edge Conditioning by Wheelabrator. Mill Proper by Yoder.

Only 20 seconds required to enter 30,000#, .500" thick x 54" wide Coils from Conveyor into Leveller, using this rugged Cone Type Uncoiler equipped with hydraulically operated Peeler and Coil Opener.

Heavy duty Up-Cut Shear equipped with Fawick Air-Flex Clutch. Shear travels hydraulically and automatically cuts at speeds of 45—180 FPM.

Over Hung Mandrel Type Side Trimmer equipped with eccentric sleeves on both top and bottom arbors to insure best possible edge for welding operation and longer knife life.

Another example of how

"YOUNGSTOWN"

serves the steel industry

This modern mill utilizes "YF&M" Auxiliary Equipment to produce 4½"—16" Dia. Electric Weld Pipe. Material: Hot Rolled Skelp Steel; width: 15"—54"; thickness: .125"—.500"; coil weight: 30,000#; line speed: 45—180 FPM. Advanced design and rugged construction for highest efficiency are features of this mill and its precision equipment.

YOUNGSTOWN Auxiliary Equipment built for this new Pipe Mill

- CONE TYPE UNCOILER
- COIL PEELER
- 7-ROLL ROLLER BEARING LEVELLER
- TRAVELING UP-CUT SHEAR
- SIDE TRIMMER
- SCRAP CHOPPER
- PINCH ROLL STANDS
- TABLES WITH SIDE GUIDES

Whatever your needs we'll be glad to quote, or discuss your problems

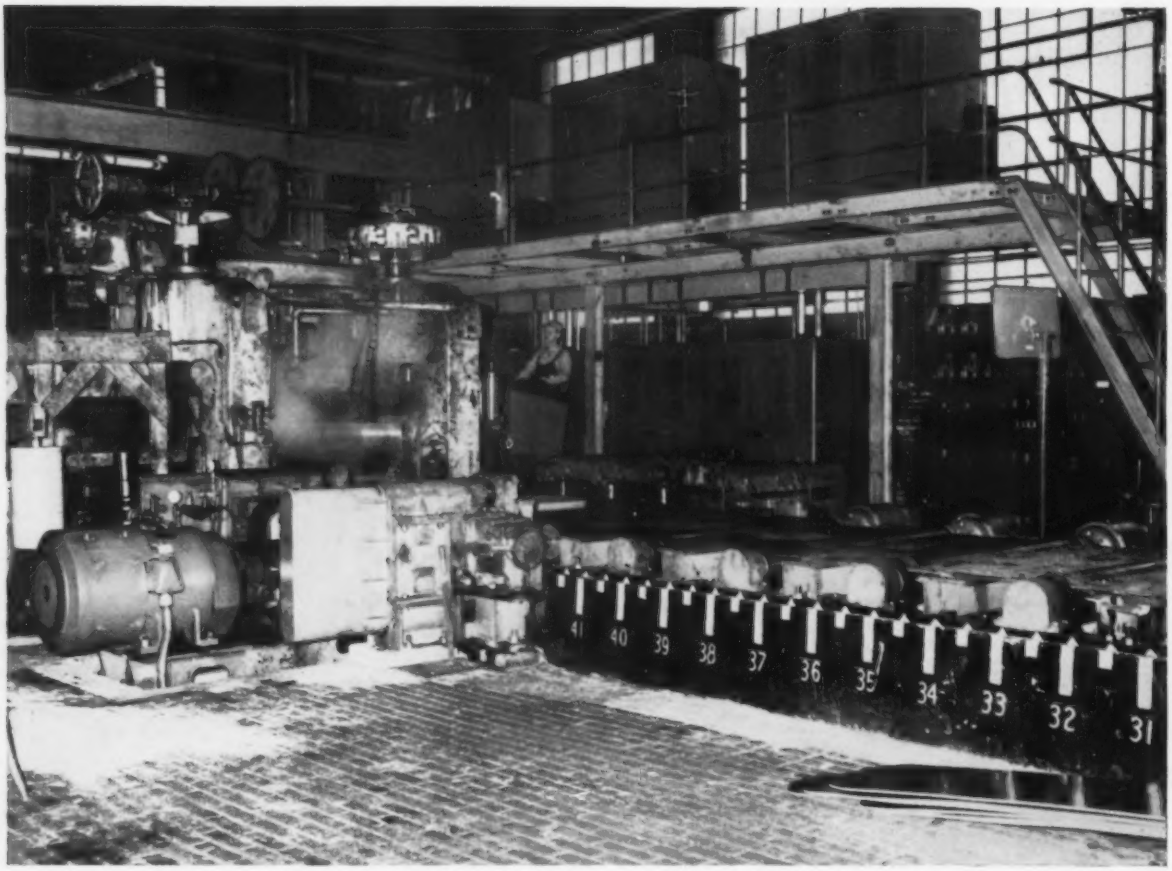
The Youngstown Foundry & Machine Co.

SERVING INDUSTRY SINCE 1885

Youngstown 1, Ohio

HEAVY MACHINERY • AUXILIARIES • CASTINGS • ROLLS

"YF&M" builds the best of them



Packaged M-G sets and controls are located right at the hot mill in Revere Copper and Brass, Incorporated's New Bedford, Mass. plant

Reliance Packaged Drives cut Modernization Cost 20%

Instead of one large motor-generator set, Revere Copper and Brass, Incorporated used five packaged V★S Drives to power the edger and tables on their rebuilt hot mill.

Reliance Drives package the M-G sets with controls and put them right at the mill itself. Conduit runs are of minimum length, which reduced not only material costs but construction time.

Control installation was vastly simplified. Each V★S Unit was prewired and pretested before shipping. The complete V★S Cabinets had only to be set in place and connected. Extra construction was not required for a generator room.

Packaged V★S Drives cut costs for Revere and gave more flexibility of operation and greater ease of maintenance. Reliance Packaged Drives will reduce drive installation and operating costs for any type of mill.

For complete details contact your Reliance representative, or write today for Bulletin No. D-2506. L-1586

RELIANCE ELECTRIC AND ENGINEERING CO.

DEPT. 23A, CLEVELAND 17, OHIO
CANADIAN DIVISION: TORONTO, ONTARIO
Sales Offices and Distributors in principal cities

New Athey PW20 dump trailer built 11,000 pounds lighter with USS "T-1" Steel; has lower operating costs and new 3rd (or rear) door design.

Hauls payload over 3½ times its own weight!

—built entirely from USS "T-1" Steel

This new Athey Bottom Dump Trailer is unique. It weighs only 22,500 pounds but has a payload capacity over 3½ times as great: 80,000 pounds. According to the manufacturer, this high ratio of payload to weight is unequaled by any similar equipment.

Trailer weight reduced by 11,000 pounds. That's a lot of weight to take out of a trailer, but the job was done by using USS "T-1"* Steel throughout. This steel has high impact abrasion resistance and nearly three times the yield strength of structural carbon steel. This permitted reduction in plate thicknesses and a weight saving of 11,000 pounds. There was no sacrifice of strength or ability to take punishment.

Ready weldability. The trailer is all-welded, and the USS "T-1" Steel retains its superior strength and toughness after welding—at temperatures even down to 50 below zero. Thus, all parts of the body including the drawbar can be welded without loss of strength.

Build better with USS "T-1" Steel. No other steel possesses the remarkable combination of high yield strength (90,000 psi), toughness and weldability found in USS "T-1" Steel. When you also consider the high resistance to impact abrasion, you have a steel that will save money on construction and mining equipment. For more information, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

Remember that we also make USS COR-TEN*, USS TRI-TEN* *and* USS MAN-TEN* *Steels . . . standards for heavy-duty equipment.* *Registered trademarks.

United States Steel Corporation–Pittsburgh
Columbia-Geneva Steel–San Francisco
Tennessee Coal & Iron–Fairfield, Alabama
United States Steel Supply–Warehouse Distributors
United States Steel Export Company

USS United States Steel

You're looking at the largest forged plate-bending roll ever made

You can never be certain about these things, but we think that the USS Quality Forging in the picture *is* the largest roll ever made for a heavy plate-bending machine. Three of these rolls are arranged in a pyramid, with one alloy steel roll assembled above two carbon steel grooved rolls. A steel plate is rolled back and forth between top and bottom rolls, and the plate is bent as the top roll is tightened down on the bottom two.

As you see it in the 10,000-ton press at our Homestead Forge Shop, the roll is 30″ in diameter and about 60 feet long. You have to use very special techniques to handle a forging of this size during the forging and heat treatment operations

—but the specialists who produce USS Quality Forgings really know how to do it.

After forging, the machining presented some interesting problems. The work surface, or face, of each bottom roll is about 480″ wide, and is tapered from a 30¾″ diameter at the center to 30⅝₁₆″ at the ends. Twelve longitudinal grooves are machined in each bottom roll, equally spaced around the roll body circumference. The grooves are ¼″ wide by 5/16″ deep, and they improve the grip on each steel plate as it is rolled back and forth in the bending machine.

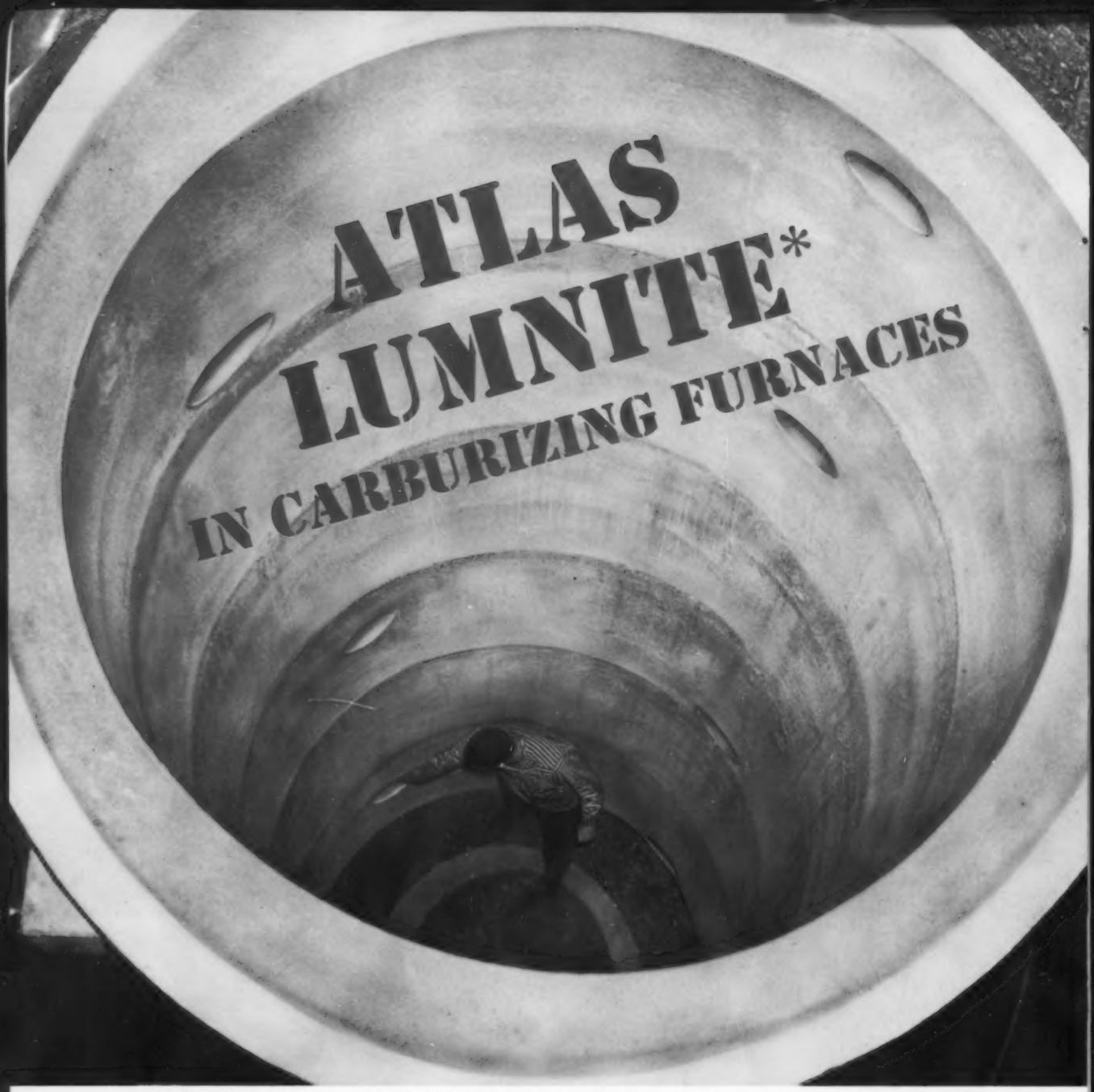
There are only a few places in the world where you can get forgings like this, and United States Steel is the *one* place where you can get that extra bit of skill that distinguishes a USS Quality Forging. And don't forget that in this instance we made the steel, forged, heat-treated and machined it in one plant.

We'll appreciate your inquiries or requests for our free 32-page booklet on USS Quality Forgings. Please write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS is a registered trademark

United States Steel Corporation–Pittsburgh
Columbia-Geneva Steel–San Francisco
Tennessee Coal & Iron–Fairfield, Alabama
United States Steel Export Company

USS **United States Steel**



Vertical pit-type carburizing furnace (9' x 24') lined with an insulating castable refractory made with LUMNITE cement. Operating temperature to 1800° F. Badall Engineering & Manufacturing Co., Hammond, Ind. Castable used: "Kast-O-Lite," product of A. P. Green Fire Brick Co., Mexico, Mo.

"...withstands thermal shock...reduces heat loss,"

says Fred F. Badalli, Badall Engineering & Manufacturing Co.

- Refractory concrete linings (made with LUMNITE calcium-aluminate cement and selected aggregates) resist furnace temperatures to 2600° F . . . protect against thermal shock due to heating-cooling cycles . . . provide insulation.
- Construction is fast, easy, economical. Linings can be cast in place, troweled or "gunited" . . . service strength is reached in 24 hours.

For maximum convenience, use castables made with LUMNITE cement. These are packaged mixtures, ready for use. Just add water, mix and place. Made and distributed by leading manufacturers of refractories.

For literature on refractory concrete, write:
Universal Atlas, 100 Park Avenue, New York 17, N. Y.

"LUMNITE" is the registered trade-mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company

UNIVERSAL ATLAS CEMENTS

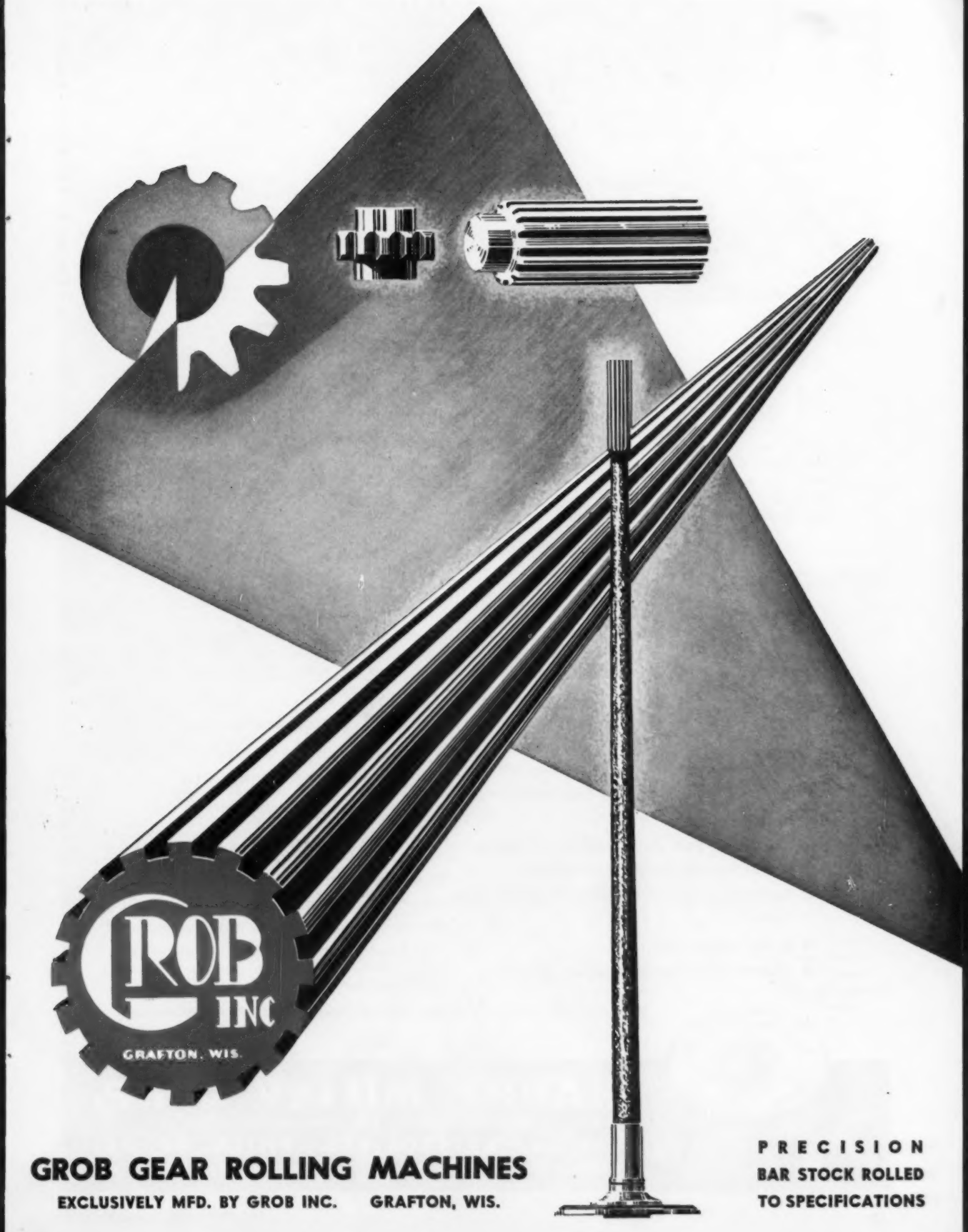
USS

TRADE-MARK

L-186

UNIVERSAL ATLAS CEMENT COMPANY—member of the industrial family that serves the nation—**UNITED STATES STEEL**

OFFICES: *Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco*



GROB GEAR ROLLING MACHINES

EXCLUSIVELY MFD. BY GROB INC. GRAFTON, WIS.

PRECISION
BAR STOCK ROLLED
TO SPECIFICATIONS

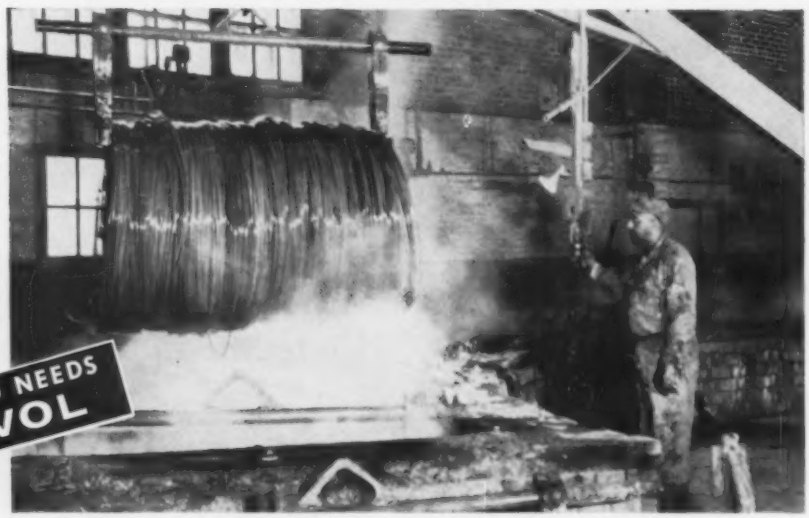
• *Clean Metal While Regulating Acid Action with*

ACTIVOL

Reg. U.S. Pat. Off

save acid . . . save metal . . . speed cleaning

ACTIVOLS can be used with any acid, in any strength or ratio of dilution to form clear, true solutions.



ACTIVOL, an original departure from coal tar derivatives, is completely soluble in all acids and it is widely used for every phase of pickling, equipment cleaning and acidizing because it:

- **prevents the destruction of base metal by regulating acid attack.**
- **forms a protective shield to prevent rust.**
- **saves metal and acid.**
- **speeds cleaning and pickling cycles.**
- **prevents pitting and burning.**
- **insures clean metal surfaces required for galvanizing, tinning, etc.**
- **reduces sulphate build-up.**
- **controls fumes.**

There are a variety of grades of ACTIVOL—either liquids or powders offering various degrees of detergency, wetting out properties, foaming and non-foaming characteristics.

Write, wire or call for a free sample and tell us your application.

HARRY MILLER CORP. HAMICO 4th & BRISTOL STREETS PHILADELPHIA 40, PA.

Manufacturers of
HAMIKLEER, ACTIVOL, HAMICOTE,
STEELGARD, IMMUNOL

HARRY MILLER CORP.

Original Products and Processes Since 1936

4th and BRISTOL STS., PHILA. 40, PA.

DAvenport 4-4000 *Service Representatives in Principal Cities*

ONE TRIP INSTEAD OF THREE

...with world's biggest ladle crane

This 500-ton giant, designed and built by Morgan, is doing an important job in stepping up steel-making efficiency. It completes a 375-ton pour in *one trip* from furnace to molds... the 250-ton cranes commonly used in open hearth operations would require *three trips!*

Ninety years of continuous contact with industry's needs and far-sighted engineering research have brought a steady flow of improvements in cranes built by Morgan. Results have been greater speed, capacities and efficiency . . . lower operating and maintenance costs wherever you see the Morgan nameplate.

For any steel-handling operation requiring absolute precision in design and manufacture, Morgan cranes and mill machinery provide the ultimate in profitable, trouble-free performance. Let our representative show you how to speed production and lower costs in *your* mill.

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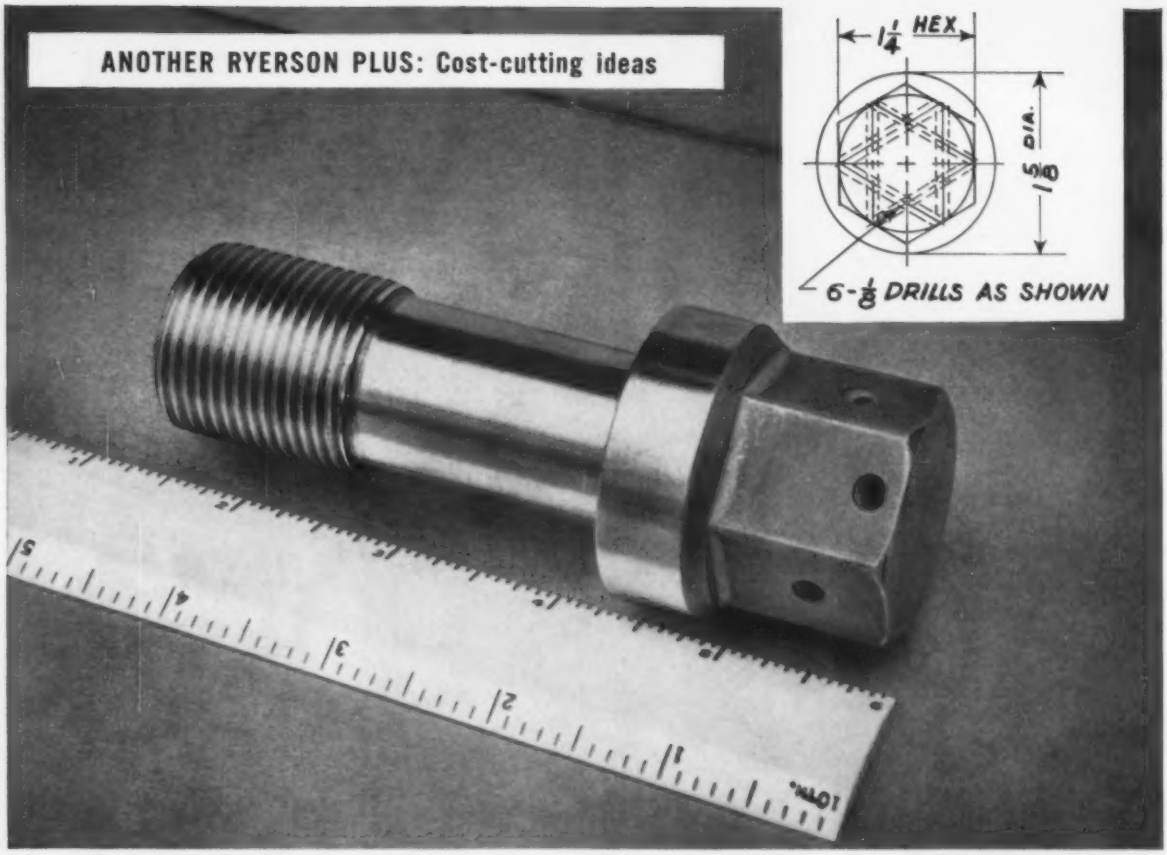


Rycut 40 drills cleanly, cuts down on tool wear and breakage.

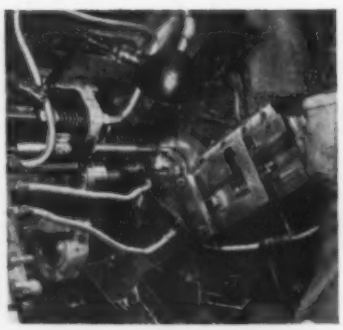
Rycut 40 alloy steel boosts production 30%, tool life 50%

Drilling piston pin bolt heads of AISI 4140 was a costly problem at Hyland Machine Co., Dayton, Ohio.

The job called for cross-drilling two holes in each face of the hex head (see diagram). A Ryerson specialist recommended new Rycut 40, the world's fastest machining alloy steel in its carbon range.

Here are the results, from Partner Forest Hyland: "We have cut down drill breakage. We have 15% fewer rejections. There is a marked improvement in finish, plus a comparable saving shown in milling the head of the bolt. Tool life on the automatic screw machines is 50% longer, total production is up 30%. Now we can produce this bolt at a competitive price."

There is a dependable, cost-cutting steel at Ryerson to meet every requirement. The Ryerson quality controls assure you of getting steel you can count on for dependable performance—every time. Ask your Ryerson specialist for help on your steel problems.



Hyland Machine Co. produces piston pin bolts on six-spindle automatic, using Rycut 40.

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To Sell Defense Plants

Shifting defense emphasis from conventional to space-age weapons is shrinking the number of plants in the military industrial reserve. The Navy alone will close 18 more in the fiscal year starting July 1, having already buttoned up 96 this year. All will eventually be sold to industry by the General Services Administration.

Oxygen for Electric Steel

At least two steel mills are using oxygen to blow down hot metal in ladles for use in electric furnaces. The duplexing technique is used for bearing steels and other high alloys. Producers are looking beyond the ladle method at the possibility of using small oxygen converters for the process.

Measures Scratch Depth

A portable instrument has been developed to measure the depth of scratches and pits on metallic surfaces. It could be a boon to manufacturers working to rigid specifications for smoothness. Calibrations on a simple adjustment knob give measurements to the nearest 0.001 in. The device will also measure the thickness of paint films.

Heat Boosts Die Life

Aluminum diecasters are nearly doubling die life with an infrared preheat. Gas fired heaters do an effective warmup job before the day's casting begins, stopping much of the erosion caused by hot metal hitting cold dies. The heaters don't take a big initial investment, it's said, nor are they expensive to operate. Infrared heat can be aimed at any angle and it does not radiate into waste space.

Steel Buyers in Dilemma

Many steel buyers are still on the fence about price-hedge buying this spring. Few doubt that steel prices will rise, but most wonder if metalworking activity will pick up soon enough to justify tying up working capital in inventory. With an expected increase of $5 to $7 per ton in the base price, the temptation to stock up is strong. But so is the fear of being overloaded in these uncertain times.

Superalloy Upturn Near?

Makers of high temperature alloys are looking for a pickup in orders. They hear that forge shops have sizable new contracts for jet engine components. Within a few weeks this activity should bring increased demand for vacuum melted alloys and a wide range of others in the hot-strength category.

Extrude Titanium Cold

Another metalworking barrier has been hurdled with the news that titanium parts can be cold extruded on a commercial basis. Hollow parts, suitable for aircraft use, were produced by both forward and reverse techniques on a 700-ton press. Typical cup shapes are 1½ in. in diam and up to 3 in. long, with wall thicknesses down to 0.22 in. Surface finish ranges from 30 to 60 microinches.

Anti-Corrosion Voltage

What's the optimum voltage potential needed to protect steel from corroding in salt water? Government researchers say it's a minus 0.77v with reference to a saturated calomel electrode. This is equivalent to —0.85v with reference to a copper-copper sulphate electrode. Laboratory tests show this potential to offer the best degree of cathodic protection under both stagnant and aerated exposure conditions.

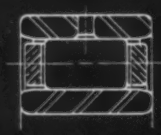
Do the Farmers Know It?

Over the long haul, the farm equipment market should be good. But the area of equipment replacement still needs to be exploited. One leading tractor maker estimates that 450,000 units should be replaced each year, assuming an average 10-year life for each one. But current production rates in the industry are only about 60 pct of this figure.

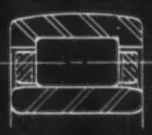
Who but MESSINGER makes them all?

Each has its advantage

RADIAL ROLLER



SELF-ALIGNING RADIAL WITHOUT ADAPTER



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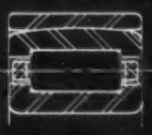
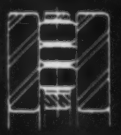
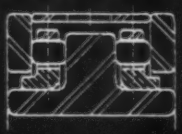


SINGLE THRUST

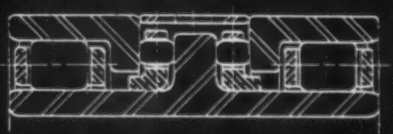


FROM **"FEATHERWEIGHT"** TO **"HEAVYWEIGHT"** SECTIONS

TWO DIRECTION THRUST



COMBINATION



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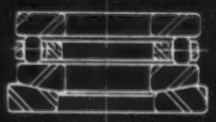
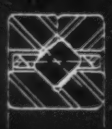


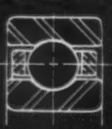
YOUR **REQUIREMENT** DICTATES THE SIZE

"X"



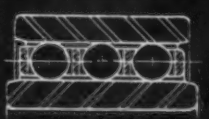
4-POINT CONTACT

ANNULAR BALL



BALL THRUST

RECIPROCATING BALL



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Let's Shore Up Our Relations With Canada

Misunderstandings and clumsy policies are straining U. S.-Canadian friendship.

It's not too late to reverse the trend, but mutual cooperation is needed.

Both countries lean on each other despite current sore spots. —By Tom Campbell.

▪ Canada and the United States will not go to war soon. Nor will there be border police along our mutual boundaries. But the once flourishing and still friendly feeling between these two great nations is deteriorating.

Despite all attempts to downgrade it, this widening of the breach between Canada and the United States is serious. Unless many things are done to narrow it, the results in years to come will be bad for both nations.

It Won't Disappear — There is the usual tendency at both country's government levels to "see nothing wrong." That is an ordinary diplomatic head-in-the-sand attitude. Some leaders on both sides feel that by pretending something isn't

Pressure Points in U. S.–Canadian Relations

What Canadians Resent

U. S. Wheat Dumping: This has caused the most serious spark of resentment among Canadians — especially her farmers, who support a third of the country's economy. They say: "We compete with the U: S. Treasury, not with the American farmer."

Oil Restrictions: This really has Canadians hopping mad. They say we egged them on to drill for oil as a national defense measure for the U. S. Then when oil was found, drilled, and promises made, we clamped on oil import restrictions. For what reason? Of all things, national defense, say the Canadians.

Gobbling up Companies: American-owned Canadian firms are treated as branch plants. These subsidiaries don't have stock for sale to Canadians, and Canadians rarely run the top jobs. There are some important exceptions.

Investors Try to be Boss: Canadians welcome American money. They protect it. But they say an investor in a foreign country can't expect to be boss. They feel that many American investors try to bulldoze the Canadians around. "Stop bulldozing us," they say.

What We're Doing About It

Thoughtful Visitors: The State Dept. has mounted a little-publicized campaign to have Americans tone down their hilarity, etc., and to act as guests should in foreign countries. Well-traveled Americans are leading the way to better relations.

Americans in Canada: Managers and workers in Canada are continually pointing out to their home offices the boners pulled by the latter. These do the business no good at all. In time, U. S. home offices will pay more attention to those on the firing line in foreign countries.

Government Moves: Our Government realizes the bad effects of the wheat and oil squabbles. It is trying to do something about it. Our ambassador is extremely active.

Growing Pains: While it might sound smug, Canadian gripes often take on an important flavor in direct proportion to the speed with which she climbs as a big power. During that phase she will tend to be oversensitive. Many Americans know that. They agree with many of her gripes, and are trying to do something about them.

FARM SCENE: Canadians say U. S. wheat dumping is depressing world price, hurting their farmers.

BUSY PORT: Grain, ore, lumber, and other products pass through Canada's busy Port Arthur, Ont.

there it will go away. In this case it won't.

What is coming to the forefront is bad for American business—and for Canadian business. There is no chance that either nation will close its borders to trade. But if you listen closely to some off-the-record talk in Canada it will startle you.

Mutual Misunderstanding — Many American businessmen just don't understand their Canadian cousins. Nor do the Canadians feel called upon to explain themselves to those Americans who look upon Canada, and her companies and resources as "Little America."

Talks with Canadians in their homes, factories, mines, bars, and government offices tell the same story — the widening gap between us and our friends to the north. Vague are the reasons why this is so but sharp are the negative trends. Lest one get the idea that people from both sides of the border are up in arms let's knock that one down. They are just confused or unaware on one side (ours) and frustrated on the other side (theirs).

Two-way Street—This is no attempt to dwell entirely on the Canadian point of view. It is an attempt to get behind the courtesies on both sides to see what is happening to relations between the USA and Canada. Sooner or later misunderstandings as they now exist will have a direct bearing on imports, exports, prices, sources of supply, nationalistic trends in Canada, cost of Americans doing business in Canada — and most important of all: Our relations at a future date when we will be depending even more heavily on Canada for basic raw materials and minerals. Besides, Canada is our major ally whether we know it or not.

Due to American and other foreign investment in the past 20 years Canadian industry and trade have skyrocketed. So has the Canadian standard of living. And so has Canada's national pride. As this happened the once-held inferiority complex produced by the strong nation to the South and by the former dependency status with Great Britain has gone down the drain.

Investors Can't Dictate—Today Canadian industrialists appreciate the investments from the USA. But at the same time, as one eminent and highly placed Canadian official says, "We welcome, we want American money but such investors should realize that they are foreigners and hence they can't be the boss in our country."

What are some of the concrete beefs the Canadians have? For one thing, the Canadians are a sovereign people, and they want to be looked upon as a major country—not as another State of the USA or as a dependent of Great Britain. That one is easy to solve. All we need is for more Americans and for more Canadians to spread the word by promotion, by friendships and by joint endeavors—without the USA always being the top dog, the one who is always right, and the one who always reminds people whose money it is.

Farmers Resent Dumping — Basically our government has antagonized 100 pct of Canada's farmers by our wheat dumping program. As the Canadians see it, their farmers must compete with the United States Treasury which—they say—subsidizes our farmers. The Canadian farmer gets the world price for his wheat, not a supported parity price as our farmers get. Not only that say the Canadians: American wheat has been dumped on the world market at low prices, thus depressing the world price which in turn hits the pocketbook of the Canadian farmer who now gets less. This action, they say, does not even consider under-the-table depressed prices arrived at through so-called barter trading—with raw materials—which recently came to an end; or a near end.

Somebody Loves Us — Even in Quebec City where Americans are held in high esteem, the French-speaking Canadians feel that we often act too saintly, too holier-than-thou and too serious about ourselves and what we are doing for Canada. But with all that, a most favorable location for Americans where the welcome mat is the biggest is outside the office of M. Maurice Duplessis, the Prime Minister of the Province of Quebec. Not only does he like Americans, like American baseball games and American speed of action but he publicly welcomes American money. What's more, he sees that it is well preserved, protected, and gets its due rights.

The Oil Hassle—While mining people, provincial governments, and the average Canadian citizen faintly chastise Americans for their minor foot-in-mouth trouble and at the same time give American money the safest haven in the world, parts of Canada privately blow their top over our oil policy. Not too long ago—say the Canadians—the USA fostered, promoted, and recommended that Canada should drill for oil on the prairies, lay pipe lines and get ready for shipment of oil across the border as a national defense measure—for USA.

After the oil came in and plans were made for larger pipe lines—American steel in part—with oil and gas slated for the USA, we put in the "voluntary" oil import allocation plan. At first it was thought Canada was not included in the restrictions. Later they were and, say the Canadians, of all things—in the name of national defense, America was limiting oil imports from Canada. Truth of the matter this week is that Canada has not yet been affected by the quota set for her because she is not up to that. But Canadian trade people say that will be remedied by the USA by further limitations.

Canadians Shut Out — Another sensitive factor in the deterioration of relations between our two countries is the gobbling up of Canadian companies: Later they become American subsidiaries with no top Canadian officers and no chance of Canadians investing in a Canadian firm.

This predominance of American subsidiaries in Canada — without the chance of Canadians moving up to top jobs (they don't in most cases) and without the chance for Canadians to cash in on the growth of their industries through stock buying—is serious—and ominous.

What To Do — Adding all this up: It would appear that things might be close to the breaking point between the two countries. They aren't. And that's why many look upon stories such as this one as crying wolf, wolf. Nothing could be farther from the truth, say Canadian and many American businessmen.

But what can be done to calm down Canada's fears of being swallowed up or overcome by influence from across the border? A series of things could be done if both countries are to try to know each other better: News stories, visits, exchange groups, moving pictures, lectures in schools, talks by top USA executives who believe in Canada shaping her own destiny, a drive by the State Dept. on how not to act when in Canada, a more serious concentration on items such as world wheat sales, oil restrictions, and more American-financed but Canadian-run firms.

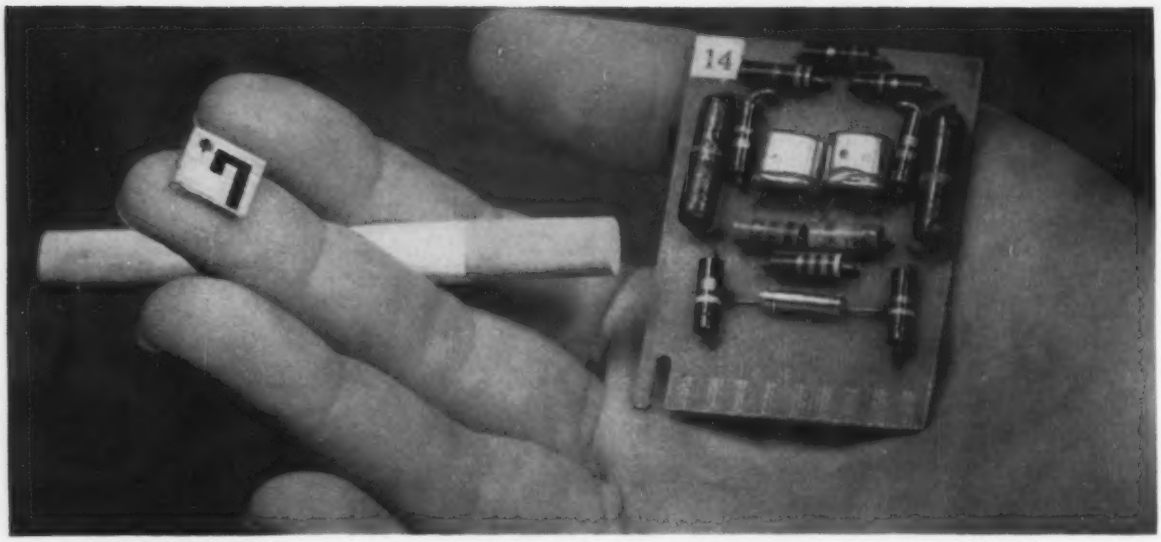
Behind This Story

Tom Campbell

With much talk about a change in relations between the U. S. and Canada. The IRON AGE assigned its editor-in-chief, Tom Campbell, to get the facts, the feelings, and the color on that question.

Mr. Campbell interviewed old friends in mining, commerce, government, and publishing. He has "commuted" to Canada for more than 10 years. His friends and acquaintances there lay it on the line with him. This time he went also to new sources in high government positions to sound out their attitude.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.



TOP AWARD WINNER: Transistor winning Miniaturization award (on fingertip) contrasted with present-day unit.

Tiny Transistor Wins Big Award

The first annual Miniaturization award goes to the Ordnance Corps this week.

Prize winner is a transistor unit small enough to fit on a fingertip.

▪ Miniaturization's highest award has gone to a transistor unit small enough to fit on a fingertip.

Its developer, the Diamond Ordnance Fuze Laboratories of the U. S. Army Ordnance Corps, received the first annual Miniaturization award this week in New York.

New Concept Honored — Established to recognize the individual, organization, or achievement which has done the most to further the concept of miniaturization, the award is sponsored by Miniature Precision Bearings, Inc. It is administered by an independent committee composed of representatives from industry, education, the military, and government.

Diamond Ordnance was selected by the committee for this year's top honors for "developing a new concept to miniaturize electronic parts and sub-assemblies through the use of photolithographic processes and printing techniques."

The concept is believed to make possible the forming of microminiature electronic sub-assemblies such as flip-flop counter stages and amplifier stages. In these all the components, including transistors, diodes and connecting leads, are formed on or mounted in holes in a ceramic plate.

Why Miniaturization Grows — Horace D. Gilbert, Chairman of the Awards Committee and president of Miniature Precision Bearings, Inc., made the award presentation to Lt. Col. John A. Ulrich, Commanding Officer of Diamond Ordnance Fuze. Ten certificates of excellence in miniaturization were presented to other winners.

Mr. Gilbert attributed the growth of miniaturization to "a greater emphasis on the need for miniaturized products and components in missiles, rockets, jet aircraft, and many civilian applications," together with the "many significant technical developments which have opened up new possibilities for miniaturization applications."

Size Determines Use—Dr. Allen V. Astin, Director of the National Bureau of Standards, said that miniaturization is an art and a science, requiring both scientific discipline and artistic ingenuity.

He added that modern technology is rapidly becoming more and more dependent upon mechanical and electronic devices. As the complexity of these devices increases, he pointed out, their size must be kept within reasonable bounds if their usefulness is not to be severely restricted.

Dr. Astin observed that miniaturization is closely associated with accurate measurement in two areas. First, in requiring precise measurement to achieve miniaturization. Second, in speeding the solution of scientific and technical problems

He listed major areas where progress depends heavily on miniaturization as the basic physical and medical sciences, automation, aeronautics, guided missiles, satellites, and space exploration.

Construction Equipment Revives

Bigger Building Programs Are Reversing Downtrend

Despite earlier cutbacks, at least three equipment makers are upping output.

Builders say inventories are not as high as rumored.

▪ Like a used dozer blade, the construction equipment market has a battered look, but surprising strength. Obscured by recent reports of cutbacks is the fact that at least three major producers have revised production schedules upward in recent weeks.

Builders say the "acres of inventory" aren't quite so big, or quite so common, as earlier reports suggested. One manufacturer points out that despite a sag in his factory business, his dealers enjoyed a record sales year in 1957. Sales are below a year ago by 33 pct, but so are dealer inventories.

Moving Upward—Another producer: "Heavy equipment began moving on new orders last week. Our export order book picked up three weeks ago. We're upping production schedules. Not much, but we're upping them."

Manufacturing schedules don't look good in the annual reports. But the depressed activity has slashed the inventory pileup that began early in 1957. A few sharp-eyed manufacturers began cutting back their building rate in May, but the slowdown wasn't industry-wide until October. As a result, the reported industry pileup just doesn't exist at many plants, and is far lower than trade gossip at others.

Reason for Hope — There are other reasons for the wave of hope. Sales last year ran downhill all the way, but it still rates as the industry's second or third best year.

There's still cash in the till. Total new construction cost $50 billion in 1956, dropped to $47 billion last year, could move back to $50 billion or slightly higher in 1958. Whether it rides up or down, there'll be more highway dollars.

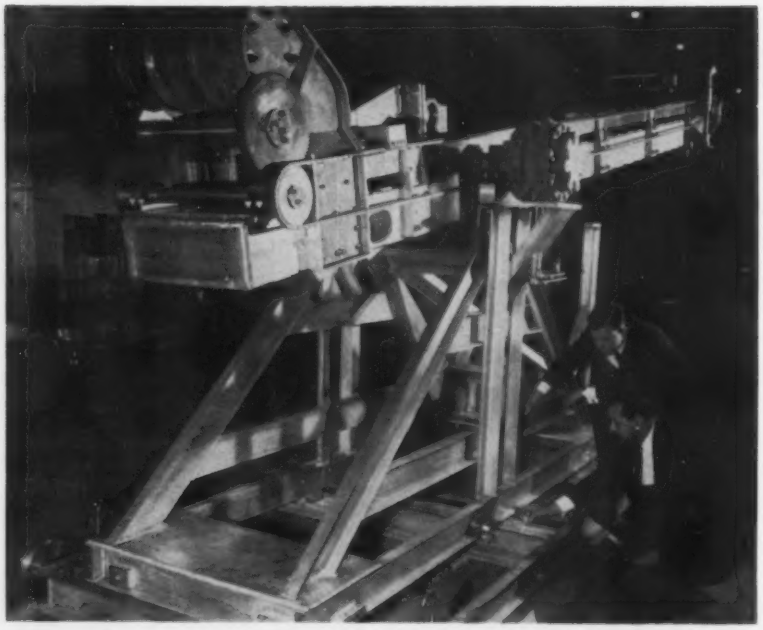
Allis-Chalmers' Boyd Oberlink says that of $5.8 billion available for highways in '57, only $4 billion was actually spent for construction. Other sources believe that 60-67 pct of new highway dollars in 1957 went for right-of-way purchases and engineering. These same sources believe 1958 will find a minimum of 50 pct of highway money spent for actual construction. Mr. Oberlink believes highways will be assigned $6.5 billion this year, of which $4.6 billion will go for actual construction.

Idle Equipment—Reappraisal of the available contractor fleet is also brightening the prospects. While it's true that only 44 pct of contractors' equipment was used in 1957, it's equally true, says one large builder, that not much more than 50 pct was working in record 1956.

Expected Equipment Boom Never Came

Quarterly Shipments, Earthmoving and Excavating Types

A Big Splash in Nuclear Fields



HOT STUFF: A machine for handling radioactive materials under 18 ft of water as a shield was displayed by Westinghouse Electric Corp. at the Atom Fair, Chicago. It was built by the Mechanical Div., General Mills, Inc., and will be installed at a nuclear materials testing reactor now being built at Waltz Mill, Pa.

Expects Improvement

Steel industry operations should show improvement by midyear, if not sooner, says Joseph L. Block, president, Inland Steel Co., Chicago.

Block said he saw "no clear sign of a change in trend," but based his prediction on the fact that steel inventories have been drastically reduced. The industry is operating at a much lower level than the economy in general, he continued.

The Federal Reserve Board index of industrial production is off only 11 pct, he pointed out, while steel production this quarter is off 40 pct.

Martin Profits Sag

Current backlog of Martin Co., Baltimore aircraft maker, stands at $795 million. About 60 pct is for missiles and associated equipment, according to George M. Bunker, company president.

Last year's sales of $423.9 million was up 18 pct over 1956. But the net income of $9.8 million was down from the $10.8 million racked up in 1956.

Mr. Bunker adds, "Research, development and production contracts which make up the backlog are such as to indicate that in 1958 results for the year will be comparable with those of 1957."

Interior Works on New Minerals Program

Interior Secretary Fred Seaton is pressing the work on a new, long-range domestic minerals plan. The details are expected to be ready for presentation to Congress about the middle of April.

Foreign Competition — Contents of the plan are being kept under close wraps.

However, it is known the plan is related to the competition, painful to the domestic suppliers, between U. S. and foreign minerals producers.

Recommendations on what should be included in the program have come from Assistant Secretary Royce Hardy and others at the Interior Dept. Mr. Seaton has approved some of the proposals. Others are to be cleared with interested federal agencies.

Senate Hearing—Mr. Seaton was invited to appear at current Senate Interior subcommittee hearings on the question of help for domestic minerals suppliers. However, he asked to be excused.

The hearings, opening on March 24, are to get the views of federal agencies, the American Mining Congress, fluorspar producers, and western governors.

More Roller Bearings

The Shafer Bearing Div., Chain Belt Co., has begun operations on a new million-dollar addition to its plant at Downers Grove, Ill.

The project is aimed at expanding production of industrial and aircraft roller bearings.

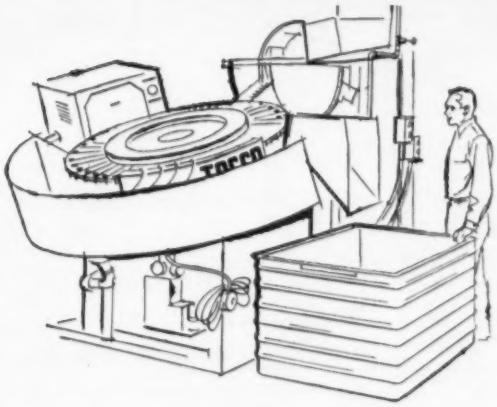
New features will include isolated heat treating and plating departments and a centralized cooling system for grinding machines.

Hall Lamp Expands

C. M. Hall Lamp Co., automotive lighting equipment parts manufacturer, has announced an expansion program that will provide greater capacity for defense business as well as the automotive field. Harry D. Hirsch, president, said the firm has acquired an addltional 85,000 sq ft of floor space for manufacturing, warehousing and offices.

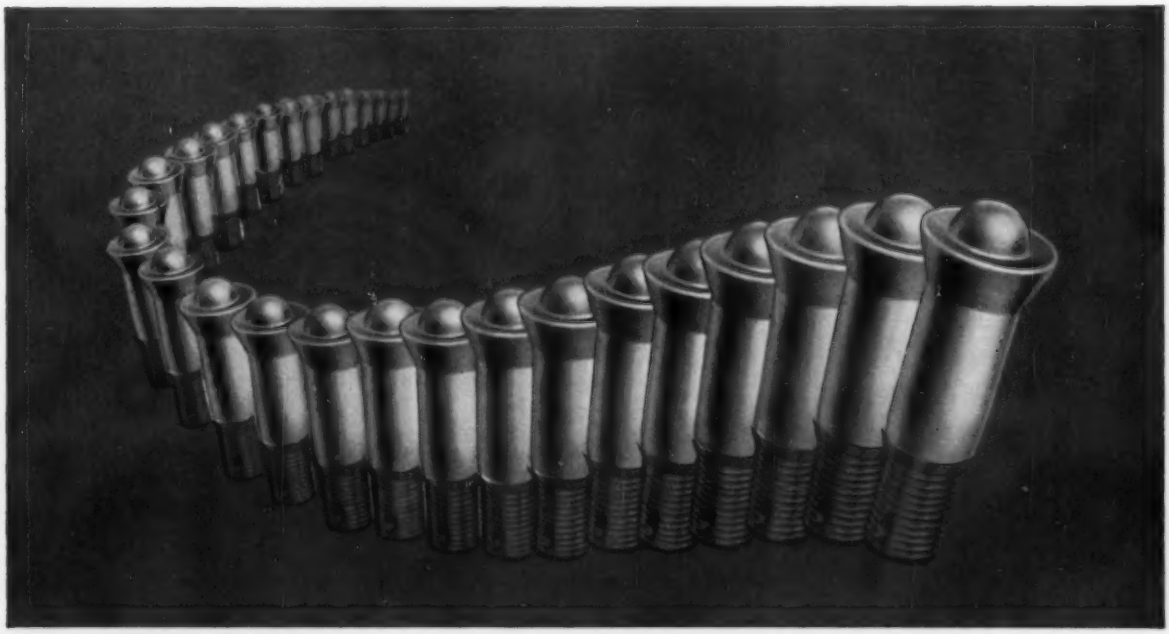
The new facilities will provide Hall Lamp with space for warehousing, volume production of a metal honeycomb structural material for aircraft and missiles, and research offices. Mr. Hirsch, who undertook management of the firm in 1954, said Hall Lamp's production last year was at the highest level in the company's 49 yr history.

THOMPSON PRODUCTS ANNEALS THREADS ON BALL STUDS



ONE A SECOND!

with TOCCO* *Induction Heating*



Up Goes Production—When progressive engineers at Thompson's Michigan Division switched from conventional gas annealing to fully automatic TOCCO for annealing threads on automotive ball studs, production jumped from 2128 to 3226 parts per hour—an increase of over 50%.

Localized TOCCO heating draws threads from 60 to 30 Rockwell C, using 50 kw at a frequency of 10,000 cycles per second.

Down Go Costs—While production zoomed, costs dropped sharply with TOCCO annealing—a reduction of 34% in direct labor costs alone. With an average monthly output of 350,000 of these parts, Thompson saves thousands of dollars per year with TOCCO.

If you heat metal parts for annealing, forging, brazing or hardening, investigate how TOCCO can up *your* production and lower *your* costs.

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Steel's '57 Earnings Misleading

You Have to Probe Deep for The True Picture

Big fellows made out all right, but 21 of 29 firms earned less than in '56.

Sales were off, but higher prices boosted dollar earnings. —By G. J. McManus.

▪ Overall, 1957 was a good year for steel. In a period when much of the talk concerned market weakness, earnings and sales hit record highs. But for a true picture of what happened in 1957, you have to dig into some of the sharp contrasts of the year.

For one thing, 1957 was a lopsided year, with the first quarter strong, the second quarter good, and the rest of the year progressively worse. Two major mills operated in the red in the third quarter. Fourth quarter shipments of U. S. Steel were 22 pct under first quarter tonnage.

Reflect Price Boosts—Secondly, the gains in sales and earnings reflect price increases rather than more prosperous operations. Actual shipping tonnage fell 4 pct from 1956 to 1957. In relation to sales dollars, profit percentages increased less than 1 pct. In relation to investment, they declined 4.7 pct.

Moreover, total earnings for the industry were beefed up by gaudy showings of the two biggest mills. U. S. Steel's net income jumped 20.5 pct from 1956 to 1957. Bethlehem Steel had an 18.3 pct gain. If you take out the increases of these two, steel earnings are down from 1956.

Earnings Dropped For Most—Actually, earnings dropped last year for 21 of 29 major mills. The sharp variance from mill-to-mill can be related to size if you pick your spots. The two largest producers had the biggest increases in earnings. They had relatively high profit margins. But a full study of the returns indicates size was only one factor in 1957 showings.

See Financial Analysis, facing P. 74

Product Mix Important—Product mix made the big difference. For a plate producer like Lukens Steel, 1957 was a boom year. Shipments, dollar sales, and earnings all rose. For specialty producers like Crucible Steel, earnings and dollar sales dropped sharply in 1957.

Fast Tax Running Out—Profit bulges at U. S. Steel and Bethlehem are tied partly to the fact that both have full lines of heavy steels. Plate shipments set a peacetime record in 1957; structural tonnage hit an all-time high.

Another factor in U. S. Steel's profit picture was the decline of fast tax privileges. In 1956, the Corporation amortized $140.2 million under fast tax rights. In 1957, the figure was $115.8 million. Had there been no change in the amortization rate, last year's profit would have been down by about $12 million but the corporation would have retained an added $24 million for depreciation.

Mills Hit Depreciation Rules—For the steel industry as a whole, the tax write-off program has passed its peak. There will be a big drop this year in the amount that can be depreciated under Certificates of Necessity. If sales and shipments had remained constant in 1957 there would have been a corresponding increase in profits.

The mills say the end of fast tax will make it just that much tougher to stay even with depreciation.

1957 Steel Earnings—The Top Twelve

Net income, in thousands of dollars, of 12 steel companies rated in order of reported 1957 profits, with pct of change from 1956.

COMPANY	1957	1956	PCT OF CHANGE
U. S. Steel Corp.	$419,407	$348,099	+20.5
Bethlehem Steel Corp.	191,026	161,412	+18.3
Republic Steel Corp.	85,014	90,407	− 5.9
Inland Steel Co.	58,877	52,999	+11.1
Armco Steel Corp.	55,045	65,593	−16.1
National Steel Corp.	45,519	52,502	−13.3
Jones & Laughlin Steel Corp.	45,452	45,122	+ 0.7
Kaiser Steel Corp.	21,439	23,572	− 9.0
Colorado Fuel & Iron Corp.	14,237	12,728	+11.9
Wheeling Steel Corp.	12,078	17,672	−31.7
Allegheny Ludlum Steel Corp.	11,652	15,261	−23.6
Lone Star Steel Co.	11,329	10,151	+11.6

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having highest strength-to-weight ratio at temperatures to 1000° F

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Today, VascoJet 1000 is supplied in a wide range of shapes and sizes: squares and flats up to 256 square inches of cross section, in sizes such as 16″ square or 28″ x 8″ with guaranteed center properties; all standard bar sizes; sheet and plate from .025″ up to ½″ thick, in standard widths up to 78″ and in lengths up to 180″; solid disc and ring forgings; all rod and wire sizes.

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DATA COVER OPERATIONS OF 29 COMPANIES REPRESENTING 93.5 PCT OF THE INGOT CAPACITY OF THE U

COMPANY	Year	Ingot Capacity Net Tons	Ingot Production Net Tons	Percent of Capacity Operated	Steel Shipments Net Tons	Net Sales and Operating Revenue	Provision for Federal Income Taxes
U. S. Steel Corp.	1957	39,582,000	33,738,000	85.2	23,414,000	$4,413,806,173	$406,000,000
	1956	39,215,000	33,402,000	85.2	23,911,000	4,228,877,241	331,000,000
Bethlehem Steel Corp.	1957	20,500,000	19,123,201	93.3	13,535,705	2,624,913,123	175,000,000
	1956	20,000,000	18,322,308	91.6	13,198,783	2,343,478,150	147,000,000
Republic Steel Corp.	1957	11,047,000	8,484,615	76.8	6,211,485	1,227,257,507	89,600,000
	1956	10,202,000	9,348,898	91.1	6,783,307	1,244,214,346	94,700,000
Jones & Laughlin Steel Corp.	1957	6,900,000[1]	6,048,000	88.0	4,272,000	837,568,000	39,901,000
	1956	6,166,500	5,997,600	97.0	4,341,000	742,642,000	39,380,000
Youngstown Sheet & Tube Co.	1957	6,240,000	5,137,834	82.3	3,593,375	679,885,073	39,488,000
	1956	5,750,000	5,406,016	94.0	3,839,224	676,299,890	37,329,000
National Steel Corp.	1957	6,200,000	5,326,425	86	.....	640,967,342	43,550,000
	1956	6,000,000	5,640,393	94	.....	664,251,090	47,000,000
Armco Steel Corp.	1957	5,950,000	5,406,646	90.9	3,807,723	776,736,401	54,521,286
	1956	5,150,000	5,220,147	101.4	3,936,105	761,800,102	63,290,322
Inland Steel Co.	1957	5,500,000	5,502,000	100	4,041,130	772,380,683	60,555,000
	1956	5,200,000	4,915,576	94.5	3,852,719	731,767,967	55,142,000
Colorado Fuel & Iron Corp.	1957	2,799,500	2,163,594	77.3	1,815,406	340,755,160	14,926,000
	1956	2,500,166	2,216,248	88.6	1,994,233	333,068,664	12,821,600
Wheeling Steel Corp.	1957	2,200,000	1,828,534	83.1	.....	249,756,955	10,116,000
	1956	2,130,000	1,994,745	93.7	.....	259,554,918	18,630,000
Sharon Steel Corp.	1957	1,898,000	1,204,283	63.5	856,503	151,651,824	3,606,000
	1956	1,763,000	1,508,660	85.6	1,126,612	180,044,408	6,473,000
McLouth Steel Corp.	1957	1,574,000[6]	1,534,240	97.5	1,122,335	179,458,165	5,562,000
	1956	1,380,000	1,372,592	99.5	1,092,877	163,906,619	2,810,000
Kaiser Steel Corp.	1957	1,536,000	1,590,322	103.5	1,043,620	208,619,403	9,300,000
	1956	1,536,000	1,617,681	105.3	1,140,776	201,692,305	12,055,000
Detroit Steel Corp.	1957	1,500,000	562,477	37.0	480,911	82,458,616	3,346,000
	1956	1,290,000	1,032,237	80.0	909,261	123,616,057	9,015,000
Crucible Steel Co. of America	1957	1,423,400	.....	.....	.....	235,938,306	5,630,000
	1956	1,423,400	.....	.....	.....	263,922,898	12,910,000
Pittsburgh Steel Co.	1957	1,320,000	1,223,534	91.0	1,018,756	183,260,331	1,516,000[8]
	1956	1,320,000	1,139,882	86.4	1,077,610	179,133,961	3,127,000[8]
Granite City Steel Co.	1957	1,200,000	1,116,698	93.1	894,052	123,763,490	10,829,000[10]
	1956	1,080,000	1,151,620	107.0	1,057,932	137,131,233	15,800,000[10]
Allegheny Ludlum Steel Corp.	1957	864,200	495,280	57.3	352,989	267,647,586	13,441,000
	1956	864,200	666,918	77.2	453,822	287,078,052	16,867,000
Barium Steel Corp.[11]	1957	846,760	585,993	69.0	.....	83,885,112	3,536,000
	1956	893,000	732,600	82.0	.....	119,536,637	8,118,951
Northwestern Steel & Wire Co.[14]	1957	825,000	703,752	85.3	548,419	78,105,122	6,030,000
	1956	825,000	692,326	83.9	585,816	74,157,804	5,760,000
Alan Wood Steel Co.	1957	800,000	655,536	81.9	437,819	67,889,893	1,047,000
	1956	625,000[15]	713,859	109.1	495,098	69,330,353	2,024,000
Lukens Steel Co.	1957	750,000	758,212	101.1	566,521	130,473,207	11,687,000
	1956	750,000	703,434	93.8	512,735	105,173,925	7,675,000
Copperweld Steel Co.[17]	1957	660,000	.....	.....	.....	121,094,351	2,500,000
	1956	660,000	.....	.....	.....	100,541,926	4,220,000
Acme Steel Co.[20]	1957	608,000	383,550	63.0	717,395	147,749,000	6,186,000
	1956	608,000	564,331	92.0	925,446	134,236,000	7,197,000
Lone Star Steel Co.	1957	550,000	666,853	121.2	469,228	95,340,258	11,570,000
	1956	550,000	629,579	114.4	485,269	88,650,577	11,000,000
Laclede Steel Co.	1957	500,000	452,005	86.9	352,526	62,226,543	4,675,000
	1956	500,000	505,575	101.1	398,181	66,509,030	4,575,000
Keystone Steel & Wire Co.	1957	450,000	395,236	87.8	290,354	59,739,437	6,393,924
	1956	450,000	438,364	97.4	353,019	66,629,700	7,993,443
Continental Steel Corp.	1957	420,000	338,508	80.6	231,880	42,657,749	3,130,000
	1956	394,000	368,059	93.4	272,996	46,703,332	2,810,000
Atlantic Steel Co.	1957	400,000	229,807	57.4	175,453	28,115,864	327,000
	1956	400,000	226,970	56.7	188,657	28,765,487	910,114
GRAND TOTAL	1957	125,043,860	105,500,000[21]	84.5[22]	74,300,000[21]	14,904,100,684	1,043,969,210
	1956	119,625,266	107,000,000[21]	89.8[22]	77,400,000[21]	14,422,714,672	987,633,430
Percent Change 1957 over 1956		+4.5	−1.4	−5.9	−4.0	+3.3	+5.7

1. Includes 300,000 tons transferred 4/30/57 from Rotary Electric.
2. In addition, 3 pct sto. dividend.
3. Includes extraordinary income of $504,294 in '57 and $2,979,371 in '56.
4. Does not include capital gain of $6,411,709.
5. Includes capital gain of $6,411,709.
6. Ingot capacity Jan. 1, '57, 1,380,000; revised 5/1/57.
7. $4.5 million less sinking fund redemption requirements included in current liabilities.
8. In addition, $3,108,000 for future taxes in '56; $2,- 260,000 for future
9. Sto. dividends of 6 shares in '56.
10. Includes $4,005,000 '57 of current inco
11. '57 figures reflect

HE UNITED STATES AS OF JAN. 1, 1957

sion deral me es	Net Income	Net Income Percent of Sales	Number of Common Shares Outstanding	Earnings Per Common Share	Common Dividends Declared	Number of Preferred Shares Outstanding	Preferred Dividends Declared	Funded Debt	Preferred Stock	Comm Sto
,000	$419,406,956	9.5	53,753,622	$7.33	$161,240,991	3,602,811	$25,219,677	$216,547,272	$360,281,100	$895,89
,000	348,098,916	8.2	53,699,617	6.01	144,884,201	3,602,811	25,219,677	245,023,677	360,281,100	894,99
,000	191,025,933	7.3	44,644,188	4.13	105,298,459	933,887	6,537,209	171,212,500	93,388,700	524,59
,000	161,411,625	6.9	10,105,462	15.33	82,376,452	933,887	6,537,209	278,621,000	93,388,700	376,61
,000	85,014,422	6.9	15,595,101	5.45	46,704,184	.....	.....	75,983,700	.....	156,05
,000	90,406,665	7.3	15,510,288	5.83	40,631,054	.....	.....	40,754,784	.....	155,31
,000	45,452,000	5.4	7,785,316	5.65	18,636,000[2]	293,568	1,468,000	135,071,000	29,357,000	77,49
,000	45,122,000	6.1	6,582,742	5.61	15,896,000[2]	293,568	1,468,000	130,275,000	29,357,000	65,53
,000	42,508,579	6.25	3,441,648	12.35	17,188,171	None	None	95,500,000	None	110,62
,000	43,174,587	6.38	3,422,073	12.62	15,313,249	None	None	98,750,000	None	109,64
,000	45,518,884	7.1	7,425,622	6.13	29,667,767	None	None	111,790,998	None	74,25
,000	52,502,422	7.9	7,404,318	7.09	29,568,645	None	None	110,000,000	None	74,04
,286	55,044,509[3]	7.09	11,993,471	4.59	35,957,901	.....	.....	95,460,000	.....	119,93
,322	65,593,182[3]	8.61	10,879,827	6.03	27,709,798	.....	.....	51,330,000	.....	108,79
,000	58,876,875	7.7	5,692,763	10.34	25,617,433	.....	.....	175,814,900	.....	105,57
,000	52,998,726	7.3	5,617,973	9.43	23,876,385	.....	.....	129,236,200	.....	100,51
,000	14,236,851	4.18	3,384,463	4.04	6,767,871	195,553	557,402	51,937,000	9,778,736	16,83
,600	12,727,529	3.82	3,383,559	3.58	6,623,026	210,921	613,798	45,040,000	10,560,336	16,83
,000	12,077,696	4.84	1,936,653	5.32	6,584,312	352,306	1,768,017	41,469,900	35,230,600	19,36
,000	17,672,276	6.81	1,936,029	8.20	5,942,540	357,496	1,787,593	44,151,900	35,749,600	19,36
,000	4,046,773	2.7	1,100,000	3.68	3,300,000	.....	.....	13,200,000	.....	11,06
,000	6,905,530[4]	3.8	1,100,000	6.28[4]	3,300,000	.....	.....	4,600,000	.....	11,06
,000	9,409,977	5.2	1,487,000	5.37	.....	539,722	1,432,129	70,913,000	29,389,550	3,71
,000	8,806,258	5.4	1,487,000	5.01	.....	488,424	1,349,807	56,296,000	21,736,100	3,71
,000	21,438,507	10.3	3,249,500	5.91	1,299,800	1,515,015	2,229,496	229,515,123	37,875,375	3,24
,000	23,571,852	11.7	3,246,500	6.57	1,280,000	1,540,065	2,257,693	118,921,921	38,501,625	3,24
,000	3,004,382	3.6	3,021,832	0.90	3,021,832	45,000	270,000	24,000,000	4,050,000[7]	3,01
,000	8,747,092	7.1	3,018,932	2.78	3,018,932	60,000	360,000	26,000,000	4,650,582	3,01
,000	6,543,594	2.8	3,791,486	1.73	6,066,377	.....	.....	25,018,772	.....	47,39
,000	12,767,625	4.8	3,636,456	3.51	5,754,684	.....	.....	27,900,732	.....	45,45
,000[8]	4,155,000	2.28	1,585,890	1.80	1,546,105[9]	241,943	1,308,150	33,002,895	24,194,300	15,85
,000[8]	6,225,000	3.49	1,519,165	3.10	1,474,915[9]	241,943	1,308,150	36,098,763	24,194,300	15,19
,000[10]	9,984,451	8.1	2,127,717	4.64	6,382,015	19,658	112,812	37,800,000	1,965,800	26,59
,000[10]	15,109,411	11	2,127,044	7.04	5,290,510	23,071	135,253	35,950,000	2,307,100	26,59
,000	11,651,851	4.35	3,852,790	3.02	7,688,196	.....	.....	37,936,200	.....	3,85
,000	15,261,090	5.32	3,781,667	4.04	6,382,144	.....	394	39,609,900	.....	3,78
,000	3,062,998	3.65	4,149,495	.74	2,102,304[12]	None	None	10,113,000	None	4,14
,951	7,009,956	5.86	3,533,533	1.98	1,515,684	None	None	8,248,027	None	3,53
,000	5,225,418	6.7	2,502,113	2.09	1,991,932	None	None	7,865,055	None	12,51
,000	5,076,959	6.8	2,453,475	2.07	989,486	None	None	8,033,769	None	12,26
,000	2,054,046	3.0	696,007	2.60	974,410	48,398	241,990	6,020,000	4,839,800	6,96
,000	3,095,727	4.5	696,007	4.04	946,029[16]	48,398	282,396	5,250,000	4,839,800	6,96
,000	10,119,998	7.8	953,928	10.61	3,243,355	None	None	2,050,000	None	3,17
,000	7,504,889	7.1	317,976	23.60	1,907,856	None	None	4,800,000	None	3,17
,000	2,769,855	2.3	1,086,191	2.41	2,034,079	48,919	156,046	11,979,667	2,445,950	5,43
,000	3,440,872	3.4	790,601	4.08	1,550,187	67,248	216,036	8,260,000	3,362,400	3,95
,000	6,016,000	4.07	2,504,103	2.40	5,008,206	.....	.....	22,000,000	.....	27,82
,000	7,012,000	5.22	2,098,123	3.34	4,196,246	.....	.....	15,000,000	.....	23,86
,000	11,329,508	11.9	2,904,000	3.90	—[18]—	.....	.....	54,800,000	.....	2,90
,000	10,151,363	11.5	2,640,000	3.84	.....	.....	.....	63,300,000	.....	2,64
,000	3,838,646	6.17	206,250	18.61	1,650,000	None	None	4,000,000	None	4,12
,000	4,086,071	6.14	206,250	19.81	1,650,000	None	None	2,737,705	None	4,12
,924	6,498,163	10.88	1,875,000	3.47	3,750,000	None	None	None	None	2,60
,443	8,013,050	12.03	1,875,000	4.27	3,750,000	None	None	None	None	2,60
,000	2,756,655	6.46	516,401	5.34	1,002,722	None	None	2,000,000	None	7,22
,000	2,793,574	5.98	501,620	5.57	1,378,743[19]	None	None	2,200,000	None	7,01
,000	348,182	1.24	396,500	0.76	198,250	7,000	49,000	None	700,000	2,00
,114	838,920	2.90	389,380	2.07	486,725	7,000	49,000	None	700,000	2,00
,210	1,093,416,709	7.3	193,659,050	5.65	504,922,672	7,843,780	41,349,928	1,763,000,982	633,496,911	2,294,29
,430	1,046,125,167	7.25	153,960,617	6.79	437,703,491	7,874,832	41,585,006	1,636,389,378	629,628,643	2,105,87
5.7	+4.5	+0.7	+25.8	−16.8	+15.4	−0.4	−0.6	+7.7	+0.6	+

future taxes in '57.
ls of 61,846 shares in '57 and 58,998
005,000 net in '56 and $2,388,000 in
t income tax.
reflect spinoff of Republic Industrial Corp. 5/31.57.
12. Includes sto. dividend of $879,934.
13. Without giving effect to income taxes on bond interest and expense.
14. Fiscal year ended July 31.
15. Ingot capacity 800,000 as of 10/1/56.
16. Plus 3 pct sto. dividend.
17. Figures include those of Superior Steel Corp. for 11 months prior to merger with Copperweld 11/30/57.
18. Sto. dividend of 264,000 shares.
19. Plus 3 pct sto. dividend 12/20/56.

NITED STATES AS OF JAN. 1, 1957

Net Income	Net Income Percent of Sales	Number of Common Shares Outstanding	Earnings Per Common Share	Common Dividends Declared	Number of Preferred Shares Outstanding	Preferred Dividends Declared	Funded Debt	Preferred Stock	Comm Sto
$419,406,956	9.5	53,753,622	$7.33	$161,240,991	3,602,811	$25,219,677	$216,547,272	$360,281,100	$895,89
348,098,916	8.2	53,699,617	6.01	144,884,201	3,602,811	25,219,677	245,023,677	360,281,100	894,99
191,025,933	7.3	44,644,188	4.13	105,298,459	933,887	6,537,209	171,212,500	93,388,700	524,59
161,411,625	6.9	10,105,462	15.33	82,376,452	933,887	6,537,209	278,621,000	93,388,700	376,61
85,014,422	6.9	15,595,101	5.45	46,704,184	.....	.....	75,983,700	.....	156,05
90,406,665	7.3	15,510,288	5.83	40,631,054	.....	.....	40,754,784	.....	155,31
45,452,000	5.4	7,785,316	5.65	18,636,000[2]	293,568	1,468,000	135,071,000	29,357,000	77,49
45,122,000	6.1	6,582,742	5.61	15,896,000[2]	293,568	1,468,000	130,275,000	29,357,000	65,53
42,508,579	6.25	3,441,648	12.35	17,188,171	None	None	95,500,000	None	110,62
43,174,587	6.38	3,422,073	12.62	15,313,249	None	None	98,750,000	None	109,64
45,518,884	7.1	7,425,622	6.13	29,667,767	None	None	111,790,998	None	74,25
52,502,422	7.9	7,404,318	7.09	29,568,645	None	None	110,000,000	None	74,04
55,044,509[3]	7.09	11,993,471	4.59	35,957,901	.....	.....	95,460,000	.....	119,93
65,593,182[3]	8.61	10,879,827	6.03	27,709,798	.....	.....	51,330,000	.....	108,79
58,876,875	7.7	5,692,763	10.34	25,617,433	.....	.....	175,814,900	.....	105,57
52,998,726	7.3	5,617,973	9.43	23,876,385	.....	.....	129,236,200	.....	100,51
14,236,851	4.18	3,384,463	4.04	6,767,871	195,553	557,402	51,937,000	9,778,736	16,83
12,727,529	3.82	3,383,559	3.58	6,623,026	210,921	613,798	45,040,000	10,560,336	16,83
12,077,696	4.84	1,936,653	5.32	6,584,312	352,306	1,768,017	41,469,900	35,230,600	19,36
17,672,276	6.81	1,936,029	8.20	5,942,540	357,496	1,787,593	44,151,900	35,749,600	19,36
4,046,773	2.7	1,100,000	3.68	3,300,000	.....	.....	13,200,000	.....	11,06
6,905,530[4]	3.8	1,100,000	6.28[4]	3,300,000	.....	.....	4,600,000	.....	11,06
9,409,977	5.2	1,487,000	5.37	.....	539,722	1,432,129	70,913,000	29,389,550	3,71
8,806,258	5.4	1,487,000	5.01	.....	488,424	1,349,807	56,296,000	21,736,100	3,71
21,438,507	10.3	3,249,500	5.91	1,299,800	1,515,015	2,229,496	229,515,123	37,875,375	3,24
23,571,852	11.7	3,246,500	6.57	1,280,000	1,540,065	2,257,693	118,921,921	38,501,625	3,24
3,004,382	3.6	3,021,832	0.90	3,021,832	45,000	270,000	24,000,000	4,050,000[7]	3,01
8,747,092	7.1	3,018,932	2.78	3,018,932	60,000	360,000	26,000,000	4,650,582	3,01
6,543,594	2.8	3,791,486	1.73	6,066,377	.....	.....	25,018,772	.....	47,39
12,767,625	4.8	3,636,456	3.51	5,754,684	.....	.....	27,900,732	.....	45,45
4,155,000	2.28	1,585,890	1.80	1,546,105[9]	241,943	1,308,150	33,002,895	24,194,300	15,85
6,225,000	3.49	1,519,165	3.10	1,474,915[9]	241,943	1,308,150	36,098,763	24,194,300	15,19
9,984,451	8.1	2,127,717	4.64	6,382,015	19,658	112,812	37,800,000	1,965,800	26,59
15,109,411	11	2,127,044	7.04	5,290,510	23,071	135,253	35,950,000	2,307,100	26,59
11,651,851	4.35	3,852,790	3.02	7,688,196	.....	.....	37,936,200	.....	3,85
15,261,090	5.32	3,781,667	4.04	6,382,144	.....	394	39,609,900	.....	3,78
3,062,998	3.65	4,149,495	.74	2,102,304[12]	None	None	10,113,000	None	4,16
7,009,956	5.86	3,533,533	1.98	1,515,684	None	None	8,248,027	None	3,53
5,225,418	6.7	2,502,113	2.09	1,991,932	None	None	7,865,055	None	12,51
5,076,959	6.8	2,453,475	2.07	989,486	None	None	8,033,769	None	12,26
2,054,046	3.0	696,007	2.60	974,410	48,398	241,990	6,020,000	4,839,800	6,96
3,095,727	4.5	696,007	4.04	946,029[16]	48,398	282,396	5,250,000	4,839,800	6,96
10,119,998	7.8	953,928	10.61	3,243,355	None	None	2,050,000	None	3,17
7,504,889	7.1	317,976	23.60	1,907,856	None	None	4,800,000	None	3,17
2,769,855	2.3	1,086,191	2.41	2,034,079	48,919	156,046	11,979,667	2,445,950	5,43
3,440,872	3.4	790,601	4.08	1,550,187	67,248	216,036	8,260,000	3,362,400	3,93
6,016,000	4.07	2,504,103	2.40	5,008,206	.....	.....	22,000,000	.....	27,83
7,012,000	5.22	2,098,123	3.34	4,196,246	.....	.....	15,000,000	.....	23,86
11,329,508	11.9	2,904,000	3.90	—[18]—	.....	.....	54,800,000	.....	2,90
10,151,363	11.5	2,640,000	3.84	.....	.....	.....	63,300,000	.....	2,66
3,838,646	6.17	206,250	18.61	1,650,000	None	None	4,000,000	None	4,13
4,086,071	6.14	206,250	19.81	1,650,000	None	None	2,737,705	None	4,13
6,498,163	10.88	1,875,000	3.47	3,750,000	None	None	None	None	2,66
8,013,050	12.03	1,875,000	4.27	3,750,000	None	None	None	None	2,66
2,756,655	6.46	516,401	5.34	1,002,722	None	None	2,000,000	None	7,23
2,793,574	5.98	501,620	5.57	1,378,743[19]	None	None	2,200,000	None	7,03
348,182	1.24	396,500	0.76	198,250	7,000	49,000	None	700,000	2,00
838,920	2.90	389,380	2.07	486,725	7,000	49,000	None	700,000	2,00
,093,416,709	7.3	193,659,050	5.65	504,922,672	7,843,780	41,349,928	1,763,000,982	633,496,911	2,294,29
,046,125,167	7.25	153,960,617	6.79	437,703,491	7,874,832	41,585,006	1,636,389,378	629,628,643	2,105,83
+4.5	+0.7	+25.8	−16.8	+15.4	−0.4	−0.6	+7.7	+0.6	+

xes in '57.
,846 shares in '57 and 58,998

net in '56 and $2,388,000 in
tax.
spinoff of Republic Industrial Corp. 5/31/57.

12. Includes sto. dividend of $879,934.
13. Without giving effect to income taxes on bond interest and expense.
14. Fiscal year ended July 31.
15. Ingot capacity 800,000 as of 10/1/56.
16. Plus 3 pct sto. dividend.
17. Figures include those of Superior Steel Corp. for 11 months prior to merger with Copperweld 11/30/57.
18. Sto. dividend of 264,000 shares.
19. Plus 3 pct sto. dividend 12/20/56.

THE IRON AGE STEEL INDUSTRY FINANCIAL ANALYSIS 1957-1956

Common Stock	Surplus	Invested Capital	Working Capital	Net Income Percent of Investment	Year	COMPANY
$95,893,700	$1,741,644,377	$3,214,366,449	$679,614,493	13.3	1957	U. S. Steel Corp.
94,993,617	1,508,698,089	3,008,996,483	603,739,028	11.8	1956	
524,594,305	968,809,371	1,758,004,876	676,689,252	11.3	1957	Bethlehem Steel Corp.
376,612,630	859,734,079	1,608,356,409	683,826,330	10.7	1956	
156,055,631	541,151,244	773,190,575	212,213,811	11.7	1957	Republic Steel Corp.
155,317,286	502,176,924	698,248,994	244,937,412	13.6	1956	
77,490,000	405,776,000	647,694,000	142,969,000	7.8	1957	Jones & Laughlin Steel Corp.
65,534,000	356,260,000	581,426,000	153,783,000	8.3	1956	
110,624,638	325,721,488	531,846,126	200,886,825	8.61	1957	Youngstown Sheet & Tube Co.
109,647,308	289,967,204	498,364,512	220,825,291	9.32	1956	
74,256,220	356,123,825	551,004,815	118,154,844	8.97	1957	National Steel Corp.
74,043,180	348,308,079	532,312,345	140,711,249	10.26	1956	
119,934,711	387,756,090	603,150,801	220,084,967	9.48	1957	Armco Steel Corp.
108,798,267	320,181,532	480,309,799	191,325,287	14.07	1956	
105,574,831	301,384,563	582,774,294	186,785,479	11.0	1957	Inland Steel Co.
100,514,559	268,006,937	497,757,696	204,781,191	11.3	1956	
16,839,641	118,560,389	197,115,766	69,733,224	8.68	1957	Colorado Fuel & Iron Corp.
16,835,119	111,597,575	184,033,030	64,516,916	8.19	1956	
19,366,530	98,702,086	237,041,083	86,725,179	5.71	1957	Wheeling Steel Corp.
19,360,290	94,976,719	236,452,198	83,717,094	8.16	1956	
11,060,390	67,802,573	92,062,963	38,051,019	4.8	1957	Sharon Steel Corp.
11,060,390	67,055,800[20]	82,716,190[20]	35,115,566	9.2	1956	
3,717,500	49,049,716	153,069,766	36,918,415	7.2	1957	McLouth Steel Corp.
3,717,500	41,483,329	123,232,929	26,535,972	8.3	1956	
3,249,500	102,486,518	373,126,516	61,394,801	7.7	1957	Kaiser Steel Corp.
3,246,500	84,507,507	245,177,553	53,140,687	11.9	1956	
3,015,408	53,779,138	84,844,546	24,355,960	5.2	1957	Detroit Steel Corp.
3,018,932	54,026,855	87,696,369	24,376,260	11.8	1956	
47,393,581	68,845,039	141,257,392	52,862,076	5.4	1957	Crucible Steel Co. of America
45,455,719	67,104,069	140,460,520	60,402,277	10.1	1956	
15,858,900	51,139,742	124,195,837	32,070,254	4.61	1957	Pittsburgh Steel Co.
15,191,650	50,428,252	125,912,965	39,476,945	6.23	1956	
26,597,456	52,464,121	118,827,377	32,577,303	9.6	1957	Granite City Steel Co.
26,593,712	48,994,100	113,844,912	36,838,542	14.0	1956	
3,852,790	103,201,984	144,990,974	60,278,200	9.03[21]	1957	Allegheny Ludlum Steel Corp.
3,781,667	97,292,414	140,683,981	61,760,622	11.70[21]	1956	
4,149,495	21,313,260	35,575,755	21,327,740	10.3	1957	Barium Steel Corp.
3,533,533	26,027,074	37,808,634	16,473,105	19.71	1956	
12,510,565	15,650,183	36,025,803	7,160,489	15.6	1957	Northwestern Steel & Wire Corp.
12,267,375	12,670,706	32,971,850	11,189,669	16.6	1956	
6,960,070	20,510,362	38,330,232	6,677,753	6.4	1957	Alan Wood Steel Co.
6,960,070	19,672,716	36,722,586	7,246,607	8.9	1956	
3,179,760	37,822,858	43,052,618	21,443,298	23.5	1957	Lukens Steel Co.
3,179,760	31,613,924	39,593,684	20,980,040	19.0	1956	
5,430,955	35,623,754	55,480,326	21,413,518	5.90	1957	Copperweld Steel Co.
3,953,005	24,692,578	40,267,983	16,266,620	9.31	1956	
27,827,000	39,630,000	89,457,000	38,424,000	7.73	1957	Acme Steel Co.
23,866,000	31,565,000	70,431,000	33,688,000	10.32	1956	
2,904,000	45,499,078	103,203,078	36,131,639	13.7	1957	Lone Star Steel Co.
2,640,000	34,433,570	100,373,570	33,257,307	13.9	1956	
4,125,000	22,158,503	30,283,503	15,103,052	13.17	1957	Laclede Steel Co.
4,125,000	19,969,856	26,832,561	13,649,482	15.64	1956	
2,604,167	35,703,836	38,308,003	4,752,201	16.96	1957	Keystone Steel & Wire Co.
2,604,167	32,955,673	35,559,840	10,942,937	22.54	1956	
7,229,614	16,189,752	25,689,821	11,787,097	11.1	1957	Continental Steel Corp.
7,018,789	14,917,126	24,135,915	11,235,428	12.0	1956	
2,000,000	9,884,961	12,584,961	4,266,855	5.75	1957	Atlantic Steel Co.
2,000,000	9,613,705	12,313,705	3,951,147	8.96	1956	
294,296,358	6,094,384,811	10,836,555,256	3,120,852,744	10.1	1957	GRAND TOTAL
105,870,025	5,428,931,392	9,842,994,213	3,108,690,011	10.6	1956	
+8.9	+12.3	+10.1	+0.4	−4.7		Percent change 1957 over 1956

rp. for
erweld

20. Includes figures of Acme-Newport Steel Co., acquired 9/14/56.
21. Estimated, based on national operating rate.
22 National rate for industry by AISI.

STEEL INDUSTRY FINANCIAL ANALYSIS

Year's experience with one BLAW-KNOX LADLE ADDITIONS FEEDER brings order for ELEVEN MORE!

LADLE ADDITIONS FEEDER at Campbell Works eliminates manual feeding of ferro-manganese and controls amount and distribution of manganese to suit individual heat specifications.

... Youngstown Sheet & Tube equips entire Campbell Works with new product

After a year's experience with the Blaw-Knox ladle additions feeder, Youngstown Sheet & Tube Company equipped all twelve of their open hearths with Blaw-Knox feeders.

Lower operating costs are made possible with the new ladle additions feeder because more manganese is recovered when additions are made to the ladle rather than the furnace. Control of feed and placement permits a narrower manganese specification and increased economy.

Especially designed to the operating conditions of the open hearth shop in which it will be used, the Blaw-Knox feeder consists of a hopper, self-loading mechanism, electrical vibrating feeder and chute. A self-dumping mechanism is built into the machine to protect against electrical power failure while tapping a heat.

For further information on the Blaw-Knox ladle additions feeder or other steel plant equipment Blaw-Knox engineers are always available to discuss the latest developments in equipment and techniques with you.

BLAW-KNOX

BLAW-KNOX COMPANY
Blaw-Knox Equipment Division
Pittsburgh 38, Pennsylvania

Louis H. Winkler

A Tested Path to Metallurgy

In a lifetime of developing steel products, Mr. Winkler learned many lessons.

One of them: There's a limit to what any branch of science can accomplish by itself.

The answer: Cooperation between various branches of science and engineering.

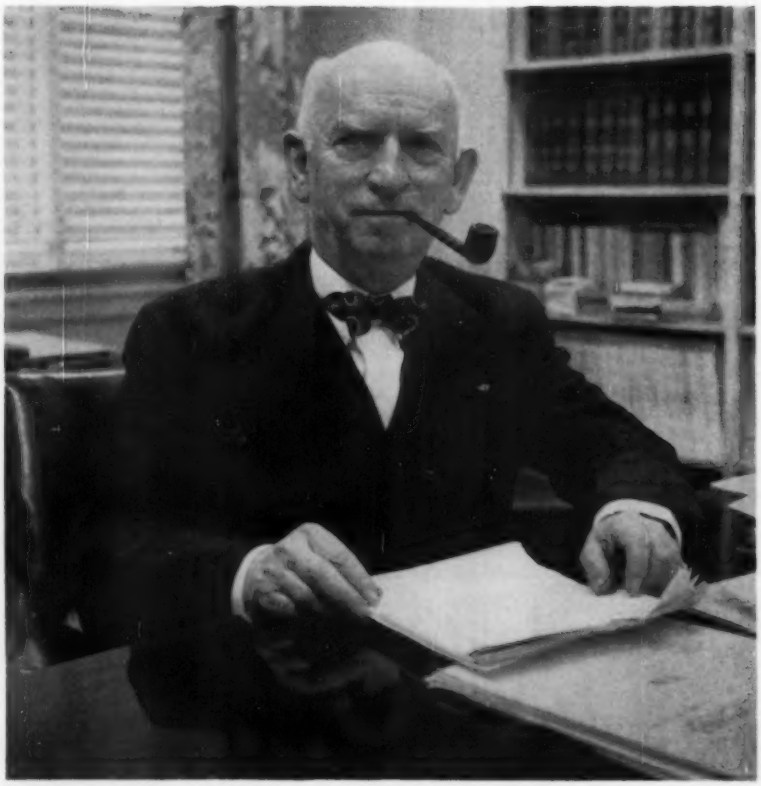
▪ What the aircraft and missile metallurgists are going through now, Louis W. Winkler has gone through many times before in developing railroad steel, wire, pipe, and other steel products.

For 39 years this dean of metallurgical engineers from Bethlehem Steel Co. has been grappling with knotty steel problems. He has become reconciled to the need for close cooperation between the various branches of science and engineering.

Dual Approach — "Laboratory tests cannot be expected to always provide the final answers," he says. "We must by all means continue our metallurgical studies. But we should not lose sight of the possibility that the best final answer and the best engineering economics might result from an approach involving improvements in mechnical design as well as by metallurgy."

Several of the industry's professional societies will first seek Mr. Winkler's advice before making important decisions involving changes in steel specifications or standards.

"He can be counted on for a sincere, clear, and concise opinion," comments one of his associates. "He's always coming up with new ideas."



LOUIS H. WINKLER: Answers aren't always found in the laboratory.

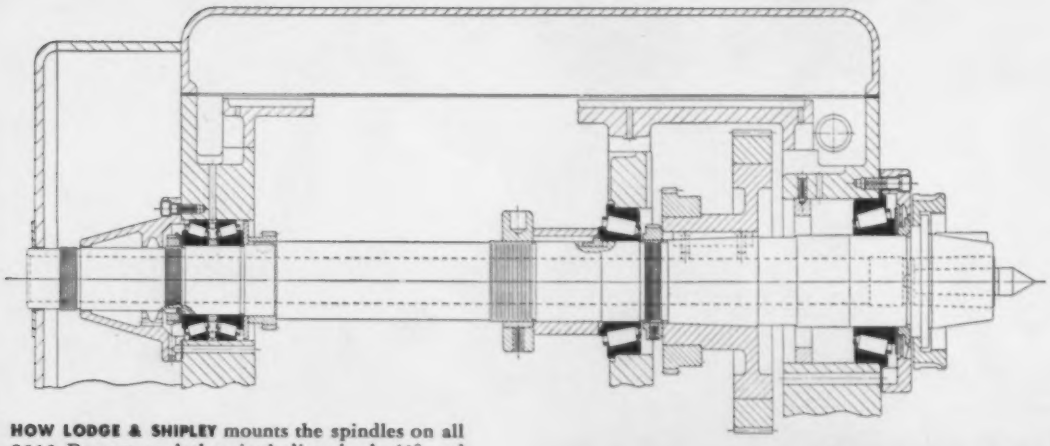
Roots in South—A transplanted Missourian, Mr. Winkler moved to Johnstown, Pa., to work for Cambria Steel Co., after graduating from the University of Missouri in 1909. He became the property of Bethlehem Steel when that company bought up Cambria in 1930.

Puffing on his favorite briar, Mr. Winkler will tell you that he "defected from the South, but I'm still a rebel at heart." He was born in Carthage, Mo., in the southwestern corner of the state.

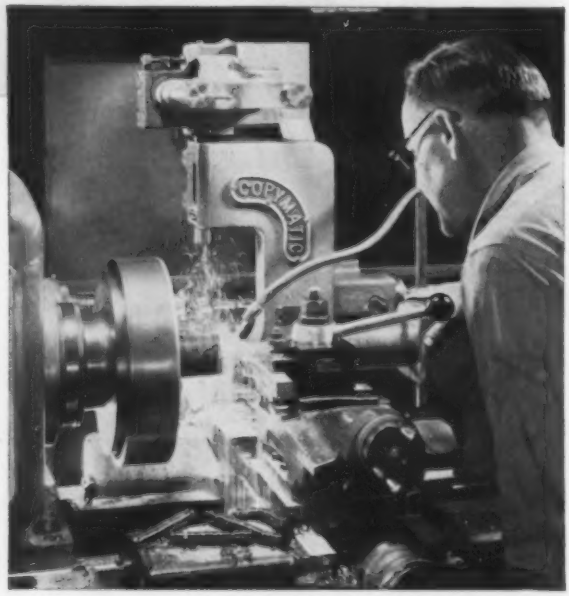
A Hard Worker — For many years he has been actively engaged in the work of the American Society for Testing Materials and is an honorary member of the society and a past director, 1946-49.

At the American Iron and Steel Institute he is chairman of the general technical committee, among others. And he is equally active in the American Standards Assn. His list of achievements goes on and on.

Mr. Winkler's metallurgical spadework has helped make possible many of the products we take for granted today—sturdy, dependable steel rails and railroad car wheels, improved pipe, coated wire, and wire rope.



HOW LODGE & SHIPLEY mounts the spindles on all 2013 Powerturn lathes including both 45° and 90° Copymatics on Timken bearings to get extra rigidity, maintain accuracy, reduce maintenance.



New type lathe ups production 200%, saves users an estimated $8,000 a year

...one secret—TIMKEN® bearings on the spindle

"Production increases as high as 200%"..."Overall savings estimated at $8,000 a year"—read user reports about the new 2013 Powerturn 90° Copymatic Lathe. One important reason for such exceptional results is that Lodge & Shipley mounts the spindle on Timken® tapered roller bearings. Timken bearings give it the vital extra rigidity and hold runout to the minimum needed for tracer accuracy.

How spindle is held rigid. Timken bearings hold the spindle in positive alignment. They take *both* radial and thrust loads in any combination, because of their tapered design. And because of full line contact between rollers and races, Timken bearings have extra load-carrying capacity.

Why heavy shocks are absorbed. Case-carburization of Timken bearings' rollers and races gives them hard, wear-resistant surfaces and tough, shock-resistant cores.

How friction is virtually eliminated. Timken bearings are geometrically designed to roll true. And they're precision-made to live up to their design. They run smoother—last longer.

We even make our own electric furnace fine alloy steel, for extra quality control. We're America's only bearing maker that does. To get all these advantages, always specify bearings trade-marked "TIMKEN". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD

Consumer Confidence Dwindles

Survey of consumer attitude and spending plans indicates a significant pessimism.

Fortunately, savings stay high and spending intent is relatively encouraging.

▪ Consumer confidence, or lack of it, is getting most of the blame for the current recession. Unfortunately, no one has ever come up with a valid blueprint for restoring this important state of mind.

One reason may be that confidence is an intangible thing. Without a clear-cut way to measure it, it's difficult to recommend measures.

Consumer Attitudes — A good starting point is the Survey of Consumer Finances, conducted each year by the Federal Reserve System in cooperation with the Survey Research Center, University of Michigan.

This year's survey pinpoints definitely a diminishing of the consumer's confidence in overall business conditions and his own earning power.

Here are some general conclusions:

Compared with last year's survey, fewer are better off than they were in the previous year.

More are worse off today than reported so a year ago.

Comparing past change in income, fewer report a higher income than reported increases a year ago. A higher percentage is making less.

Fewer expect a continuation of good times. Many more now predict a period of bad times than did last year.

A larger number expect to be making less money a year from now than predicted a pay decline a year ago.

The result: Fewer expect to purchase homes or durable goods this year. Expected spending is down, although moderately.

Throughout the survey, similarity between the present period and of 1954 and 1949 is pointed out repeatedly.

The Figures—The figures tell the story clearly.

Only 33 pct are better off this year compared with 40 pct who reported that status a year ago. The percentage reporting worse off is up from 23 pct a year ago to 30 pct today.

Only 33 pct predict good times this year, compared with 60 pct a year ago. The 39 pct predicting bad times is contrasted to only 13 pct pessimistically inclined last year.

Little Change in Savings—Thirty-seven percent believe they will be making more a year from now compared with 40 pct last year who predicted an income increase. Eleven percent predict a decline in income rate compared with 7 pct in 1957.

However, there was no significant change in holdings of liquid assets from 1957 to early 1958. About one-third report holdings of $1000 or more. This bears out general belief that savings are relatively high in spite of the recent downtrend in overall business.

But in spite of the general diminishing of confidence, spending plans are not significantly changed from a year ago.

Plans to purchase new and existing homes were less frequent than in the 1955-57 period, but more frequent than in early 1954.

Plans to purchase homes and durable goods compared with a year ago are as follows:

Houses, 7.1 pct this year, 8.7 pct in 1957; new cars, 6.6 pct this year, 8.5 pct last year; used cars, 10.5 pct this year, 8.4 pct last year; furniture and major appliances, 28.3 pct this year, 29.4 pct last year.

Broad Changes Proposed for NIAA

Marketing Group—Emphasis on the marketing concept in business is increasing steadily.

One indication of immediate interest is the proposal to change the entire structure of the National Industrial Advertisers Assn.

A special task force report, endorsed by the executive committee, recommends conversion of the group from an industrial advertising group to an industrial marketing group. The proposed new name: International Society for Industrial Marketing.

The plan for broadening the scope of the organization will be voted on at the association's annual conference June 3.

To Improve Efficiency—Intent of the change: "To close the gap in the operating efficiency on productivity on one hand and distribution on the other. In ten years productivity has risen 64 pct and efficiency of distribution 22 pct," the report stated.

Membership of the new organization would be on a company basis. Individual participation at the chapter level would be available to executives of member companies. Company memberships would be limited to those engaged in marketing industrial products and services, such as manufacturers, publishers, consulting firms and advertising agencies.

AUTOMOTIVE

Chrysler Plant Shifts Stir UAW

Relocation and Severance Payments at Issue

Chrysler's coming mass relocation of operations may get bargaining table attention from the union.

Other automakers, however, have moved plants without paying workers any transport allowance.—By H. R. Neal.

▪ When a company shifts plants and operations is it obligated to pay relocation costs for the workers transferring and severance pay for those unable to make the move?

Chrysler and the UAW seem destined to lock horns over this issue.

The company has revealed plans for one of the auto industry's greatest operations juggling acts, to be completed in time for production of 1959 model cars about Sept. Four major steps, involving a number of plants and thousands of workers in the Detroit area, are part of a long range program that is aimed at coordinating manufacturing and car assembling operations.

About 4000 Affected—The mass shifting of manufacturing and assembly operations is going to necessitate a mass shifting of workers, too. Some 11,000 Detroit area employes will figure in the operations shuffling, according to a company representative. But, he said, only about 4000 will be involved in actual relocations.

While moves of this type tend to reduce employment, through elimination of much job duplication, the spokesman stated Chrysler isn't able to estimate the effect reassignments will have on total employment. "Our total employment will be based on our production schedules," he said, "and we have no way of knowing what they will be now."

Union Viewpoint — The UAW has called for a joint labor-management committee "to study the impact of automation and technological change." The union said it will also insist that the corporation pay relocation costs for workers whose jobs are transferred far from their home—and severance pay for those who are unable to relocate near the new jobs. The UAW has indicated it will seek these same goals from all automakers at the bargaining table this spring.

One union spokesman conceded the phrase "far from their home" will have to be defined carefully. A settlement of this point at the spring bargaining table could save a squabble with Chrysler later in the year when the move takes place. Engine plant workers at the Chrysler Div. plant, on Detroit's far east side, may be required to move to the Trenton plant, southwest of the city. It could mean a 50 mile or more round-trip drive to work daily through the heart of Detroit.

Odds Against UAW — But the odds are against the union winning on this particular point. Ford moved

Auto Stylists Are Ready for Space Age

MEET THE ASTRAL: In idea project "designed to create new approaches to auto styling influenced by the space age," Studebaker-Packard evolved the Astral, possibly powered by beams of ionic or nuclear force.

COLD HEADING: A WAY TO CUT UNIT COSTS

- **Eliminates extra operations; faster than forging**
- **Metal flows to shape — without waste, without machining costs**

Here's a manufacturing fact often overlooked: The same machines that spill out large volumes of standard fasteners at surprisingly low cost can also produce *special* mechanical parts . . . also in volume and also at low cost.

It's surprising what an *expert* can do with cold heading machines. Some parts that would otherwise be two or more pieces are turned out as uniform, integral units. Parts that would otherwise require slower, costlier machining spout from the cold header with little or no scrap loss. What's more, the pieces are stronger.

Case Histories: (1) Eliminating double forging operation, high speed cold heading machine cuts and bends lengths from continuous rod to form shifter lever. It also gives greater strength, improved finish, closer tolerances. (2) Instead of a machined screw assembled with separate stamped screw driver shield, hose clamp screw is now cold headed in one piece. (3) No longer cut on screw machine, insert screw for plastics costs 40% less. Cold header uses just amount of metal required.

Call on the RB&W Fastener Man. He can tell you whether or not cold heading is feasible for producing your screw machine parts, forgings and small assemblies. If so, RB&W facilities can handle your volume needs. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, New York.

R B & W
113th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Fargo. **Distributors from coast to coast.**

Spin-Lock Screws Eliminate Washers

Ratchet action teeth on Spin-Lock Screws bite into the seat of any surface the screw is driven into. Their tight hold requires about 20 per cent more torque to loosen than to tighten. With this strong grip, separate washers or other locking devices are unnecessary. One-piece Spin-Lock construction gives faster assembly, lowers inventory needs—and affords fasteners that will stay tight in products subjected to vibration or repeated heating and cooling. Send for bulletin.

12-point fasteners cut wrench clearance space

Double hex RB&W bolts and nuts measure smaller across their points than single hex fasteners. Used with an external socket wrench, they permit optimum driving torque to be applied.

Thus, while fitting cramped spaces in compact assemblies, these fasteners also assure proper preloading for *stronger* connections.

Available with plain flange, or SPIN-LOCK design.

RB&W FASTENERS—STRONG POINT OF ANY ASSEMBLY

LOOK AGAIN AT COSTS

No bones about it, grinding problems *can* pile up! But there's a quick answer! Switch to CINCINNATI (PD)° WHEELS. For now Cincinnati Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that can *save you money . . . and increase your production.*

Through the Cincinnati (PD) manufacturing process, you are assured POSITIVE DUPLICATION of the original wheel every time you reorder. "On Grade" with a CINCINNATI (PD) WHEEL means all future (PD) wheels will perform and grind exactly alike.

Yet CINCINNATI (PD) WHEELS will cost you no more than ordinary wheels.

To banish those hovering problems, get in touch with your CINCINNATI GRINDING WHEELS Distributor. He'll be glad to explain how (PD) WHEELS will save you money and increase production. Or contact us direct and we'll send one of our representatives—specialists who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

Remember — only CINCINNATI (PD) GRINDING WHEELS give you

(PD) POSITIVE DUPLICATION

CINCINNATI®
Grinding Wheels

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

° Trade Mark Reg. U. S. Pat. Off.

Automotive Production

WEEK ENDING	CARS	TRUCKS
March 22, 1958*	83,622	16,100
March 15, 1958	86,447	16,952
March 23, 1957	138,646	23,219
March 16, 1957	141,038	20,866
TO DATE 1958	1,137,000	207,100
TO DATE 1957	1,661,300	255,700

*Preliminary Source: Ward's Reports

its Lincoln operations to a new facility about 40 miles distant without shelling out for relocation or severance money. GM moved a transmission plant nearly as far, spurned the union's plea for a transportation allowance. It isn't likely Chrysler will accept an across-the-county move as the definition for "far from their homes."

What Moves Involve — The Chrysler moves to be made after preparing tooling and facilities are:

Body building and assembly operations for Imperial cars will be transferred from the firm's Jefferson Ave. plant (Chrysler) to its Warren Ave. plant (De Soto).

De Soto Fireflite and Firedome body and assembly operations will be transferred from the Warren Ave. and Wyoming Ave. plants across town to the Jefferson Ave. plant, to provide improved facilities and volume for future De Soto growth.

Dodge passenger car engine and truck engine operations presently located at the Dodge Main plant will be discontinued, and Dodge engines will be built at the Mound Rd. and Trenton, Mich., engine plants.

Chrysler engine operations will be discontinued at the Jefferson Ave. plant, and Chrysler engines will be built at the Trenton Engine plant.

Economy Is Aim—William C. Newberg, Chrysler Corp. vice president—automotive group, explained reassignments of manufacturing and assembly operations were made possible by the expansion and modernization of a number of key facilities in the production structure.

The moves should bring about sizable economies in Chrysler's operations. It has two highly automated engine plants in the area, neither operating at capacity. Concentrating engine operations in these two plants will bring about more profitable utilization of the facilities, and eliminate the remaining less efficient Chrysler and Dodge engine operations. Currently, Dodge receives some engines from the Trenton plant, which produces the completely new engine introduced by De Soto in 1958 models. Starting with 1959 models, Chrysler will probably also share the new engine.

Is the Unit-Body Design Any Safer?

One of the arguments advanced in favor of unit-body construction over conventional frame-body construction is greater safety in collisions. The question remains, is unit-body safer? The best answer to date is a cautious "sometimes."

Tentative conclusions, based on staged head-on collisions, have been advanced by a group of auto crash researchers at the Univ. of California at Los Angeles. The researchers, Derwyn M. Severy, John H. Mathewson and Arnold W. Siegel, conducted the experiments. However, they cautioned data provided by the crashes was limited.

Regardless, several apparent conclusions can be made from their findings. Among those are:

Unit-body construction shows a greater maximum deformation at impact speeds below 35 mph, but a smaller deformation past 40 mph than frame-body construction.

Difference Small—Permanent deformation is greater in frame-body construction in collisions at speeds in excess of 45 mph, but less than unit-body vehicles under 45 mph.

There is less elastic deformation for head-on impact speeds up to 50 mph in unit-body vehicles.

However, the research team said the difference in collision performance between unit-body and frame construction is small at any velocity and "chances of survival are approximately the same in either."

THE BULL OF THE WOODS

YE GODS! I'D SOON HAVE A NERVOUS BREAKDOWN IF I WAS YOU, WORKIN' NEXT TO A GUY WHO TAKES CHANCES LIKE THAT! WHAT IF HIS FOOT SLIPPED, OR HIS CLOTHIN' GOT CAUGHT IN~UGH! DON'T IT MAKE YOU NERVOUS TO WATCH THAT?
OH, I DON'T DAST T'WATCH HIM--I COULDN'T STAND IT--MY HEART'S WEAK AN' I'M VERY NERVOUS! I NEVER LOOK AT HIM!
WELL, I DON'T SUPPOSE HE EVER LOOKS AT YOU EITHER!
NEIGHBORS
T.M. Reg. U.S. Pat. Off.
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ACHESON

dispersions digest

Reporting uses for

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COLLOIDAL GRAPHITE, MOLY-SULFIDE, VERMICULITE, AND OTHER SOLIDS

THE IMPORTANCE OF 'DAG' DISPERSIONS FOR ASSEMBLY AND RUN-IN

The advantages of using 'dag' dispersions for both assembly and run-in lubricant applications are vital to the useful operating life of machinery and engines. Dry lubricating films formed on friction surfaces with colloidal graphite in volatile carriers possess many desirable advantages; lower coefficient of friction, lower bearing temperatures, smoother run-in and reduced maintenance costs. Also, protection is afforded against momentary failure of the oil supply.

United Welding rebuilds more than 5000 diesel engine blocks and cylinder heads a year. After repairing and resurfacing, all bright metal parts must be protected against oxidation, foreign particle abrasion, and lubricated for re-assembly. One material performs all of these functions. 'dag' 154 — colloidal graphite in an isopropanol carrier — is mixed in a ratio of one part 'dag' 154 to nine parts alcohol and applied by spray to each completed unit. This tough, dry lubricating film has eliminated the necessity for a protective grease coating. Foreign particles cannot adhere to the film . . . even after a year in storage, all that is necessary is to blow the dust off the part with an air hose. Since degreasing is no longer required, a substantial savings in materials and labor is realized. During the subsequent run-in operation, the microscopically-thin film of graphite minimizes wear on newly machined surfaces. In addition, because of the much lower surface tension which exists between oil and a graphite surface, oil spreads more rapidly and over a greater area — thus permitting an oil film which has been broken to re-establish itself quickly. Results are longer periods of full film lubrication and, again, less wear. Trade publication reprints are available. Also, write for Bulletin 421 on 'dag' dispersions for assembly and run-in. Address Dept. IA-38.

A rebuilt diesel cylinder head is sprayed with 'dag' 154 as assembly lubricant at United Welding Processes, Inc.

Pre-assembly application of 'dag' 213 prevents piston seizure at Walter Kidde & Co.

Walter Kidde & Company manufactures a four-stage aircraft compressor, the heart of an airplane's pneumatic system. Absolute operational reliability must be guaranteed. Lives depend on it. Therefore, particular care is taken during run-in to insure the compressor's operation against the possibility of piston seizure. By applying 'dag' Dispersion No. 213 — colloidal graphite in an epoxy-resin solution — to the aluminum pistons before assembly, Kidde has solved this problem. The piston coating is applied by spray, then oven cured at 350° F. for 2½ to 3 hours. The result is a film which is hard, durable, and inherently slippery. During run-in the graphite works into the surface to become practically integral with the metal. The application of 'dag' colloidal graphite, together with their ultrasonic cleaning technique which prepares a cleaner surface beforehand, completely eliminates galling and seizure thus cutting rejects during break-in to 2%. Acheson dry film lubricants provide the answer to many such pre-assembly applications; surface protection against oxidation, aiding press-fits of cylinder liners into engine blocks, etc. Bulletin 435 on dry film lubrication and reprint MW, containing further information is available at your request. Or call in your Acheson Service Engineer.

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Are We Due for More Inflation?

Administration Says Spending Schemes May go Too Far

Here's why: Congress may be going overboard trying to stem the recession.

Paying for the projects has boosted the amount of money in circulation.

Some Federal Reserve Board members say overspending will force wage and price increases. —By G. H. Baker.

▪ Inflation, not recession, is likely to be the nation's big economic problem before this year is out. This apparent contradiction comes from the Administration's top financial experts.

Here's what they say is happening: Congress, fired by election-year zeal, is going overboard setting up new spending schemes. The Treasury, faced with a sharp rise in demands for cash to pay for these new projects, has returned to deficit financing. The amount of money in circulation has increased substantially.

Pressure for Action—Congressmen of both parties are impatient to end the recession. Experts have explained to congressional leaders that recovery is already under way. But this is difficult for a jobless worker, or a politician in a tough campaign, to understand. They are demanding action immediately.

Congress, by voting extra billions for military procurement, highways, unemployment pay, and for public works may have given the patient too much medicine. Several members of the influential Federal Reserve Board think this has happened. If they are right, we'll see another round of rising prices, rising wages, and rising costs in the fourth quarter of 1958.

Kennedy Proposes Labor Crackdown

Suspected shady dealings in labor union finances are getting a new raking-over in the Senate.

The labor legislation subcommittee is holding hearings on a bill to protect union finances, and curb racketeering in labor. Sen. Kennedy (D., Mass.), chairman of the subgroup, offers the new measure. He expects the Secretary of Labor, other federal officials, and union representatives to testify.

Points for Action — Points on which Sen. Kennedy feels Congress should act, according to his bill, S. 3454, are these:

1. The bill is intended to stop spending for doubtful purposes by requiring detailed reporting to the Secretary of Labor.

2. Bill would require full disclosure and outlines criminal penalties for private transactions for personal gain.

3. Loans greater than $2,500 to any officer or member of a union are barred.

4. Inclusion of false or misleading data in union financial reports would be prevented by new criminal penalties, audits, and publication of reports.

5. Bill would set up standards for trusteeships, limit duration of terms, and provide for public review.

Buy American Clauses

There's new talk in the Senate of writing "buy American" clauses into foreign aid programs to combat the recession here at home.

Sen. Knowland (R., Calif.) says he'll push for such a provision in all purchase orders issued by the government's foreign aid officials. This includes military aid.

How Much—Foreign aid chiefs are reluctant to tell how much they buy overseas.

It's About Time Something Was Done

Turn it On and Off—Government scientists say control over weather is now within our grasp.

Within a few years, weathermakers will be able to bring on either sunny or cloudy days, high or low temperatures, and even bring on or chase thunderstorms away.

Committee Report—These possibilities are outlined in a new report to President Eisenhower by an advisory committee on weather control. The committee's assignment was to report on military uses of weathermaking.

The scientists warn the U. S. may be falling behind in its studies of ways to "manage" the weather.

Red Weather — There is some evidence that Russia is becoming pretty handy at dictating weather conditions. A long-range goal of the Reds: To warm up Siberia by the artificial introduction of warm air and warm ocean currents.

only 5%
INPUT POWER...
dissipated as heat at 90 to 1 reduction

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SPEED REDUCER

high efficiency...in a right angle reducer

The high efficiency of Philadelphia Spiral-Bevel Reducers has resulted in their use for many speed reduction applications in a wide range of industries. In fact, Spiral-Bevel Units can provide ratios as low as 1 to 1, or as high as 238 to 1, making them applicable to many services where other reducer types are impractical. Another point, these units do not normally require the extra expense of a "cooling-system" to keep the operating temperatures within safe limits.

The combination of cut curved tooth Spiral-Bevel gears with accurately hobbed and shaved Helical gears assures highly efficient operation and long, trouble-free service life.

Philadelphia Spiral-Bevel Units are available in: Single, Double and Triple gear reductions in both *Horizontal* and *Vertical* types, for most every desired horsepower and ratio—they are truly *Highest Quality* Reducers in every respect.

Write for new catalog SB-57 which fully describes these modern gear units.

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Outlook for Western Steel Mills

Output Is Now Above the National Average

But producers are divided on what's in the cards.

Bethlehem is rehiring some, while Columbia-Geneva is laying off another 140 workers.

Kaiser will close its hot strip mill.—By R. R. Kay.

▪ Farwestern steelmakers are producing above the national average. But opinion is divided on the outlook.

Here's a rundown on what's doing in the mills:

Call Back at Bethlehem—Bethlehem Pacific Coast Steel Corp. is calling back about 125 employees at its South San Francisco plant. It's putting another openhearth into operation, making three hot furnaces out of the five there.

Bethlehem says the rehiring reflects a slight improvement in demand for finished steel products. Since last fall this plant laid off some 375 workers. It normally employs 1500.

Production and employment are unchanged at the company's Seattle and Los Angeles plants.

Semi-Finished Stockpiling—Columbus-Geneva Steel is laying off 140 people in its rolling mill at Geneva, U. This brings the mill's output in line with reduced openhearth operations. Four of 10 furnaces are banked.

Kaiser Steel has put three of its openhearths back into operation since January. It now has eight of its nine furnaces producing.

Kaiser says it's stockpiling the increased output as semi-finished steel. Current plant expansion calls for shutdown of the hot strip mill in April. Employment has remained at the same level since 1500 of a total 6250 employees were laid off last January.

Shipyard Outlook Good—Business at Bethlehem's San Francisco shipyard is holding up. The yard has a backlog to see it well into 1960. A tanker program calls for four ships. Two are on the ways now. The last is scheduled for delivery in the summer of 1959. And early next year the keel of the first of two cargo vessels is to be laid.

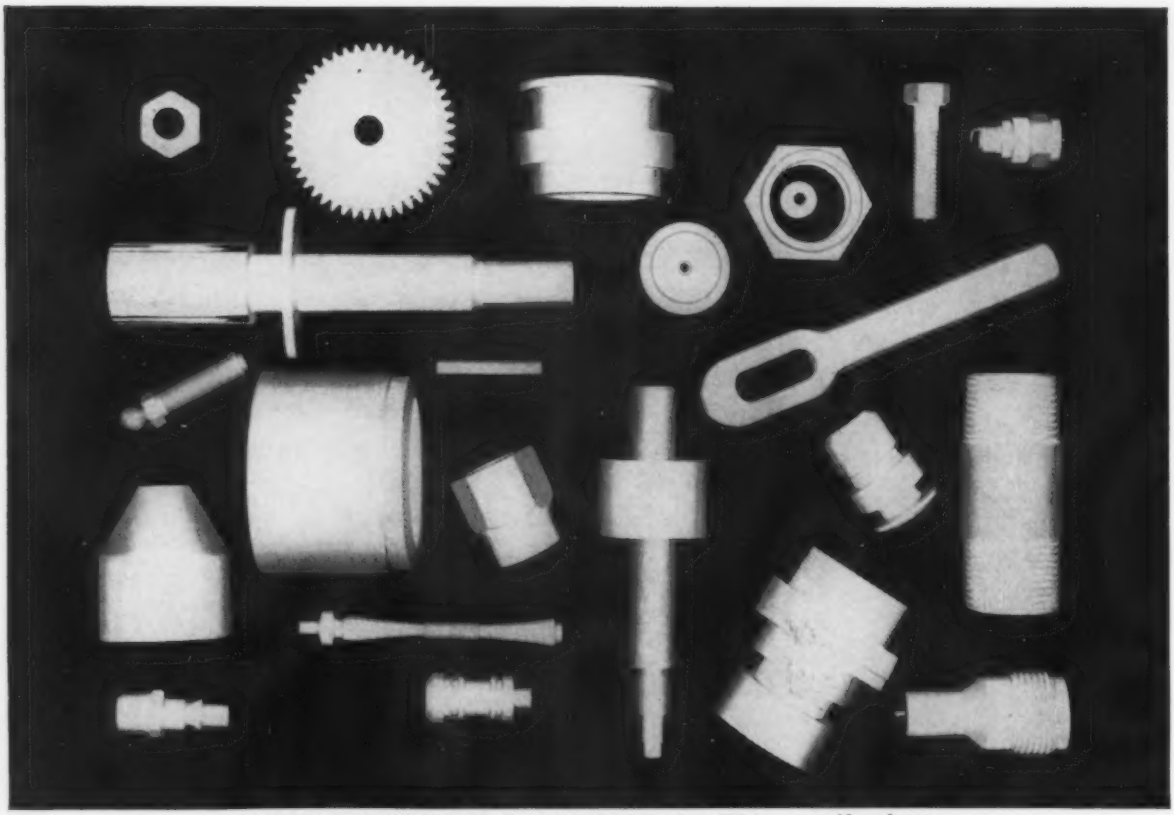
Hiring at Hughes

Thirty-five hundred more people will have jobs at Hughes Aircraft Co. this year.

The company is embarking on a huge hiring program for its Los Angeles and Tucson, Ariz., plants. It wants 2000 engineers and scientists and 1500 professional and technical workers.

Open-and-Shut Case on the Electra

RADAR: The radome on Lockheed's prop-jet airplane, Electra, swings open on top-mounted hinges for maintenance of the C-band weather radar unit. It was designed by Lockheed's engineers at Burbank, Calif.



ONE OIL, MANY METALS. Moderately priced Sunicut 5534 gave uniformly excellent results in the machining of this wide variety of top-quality steel parts.

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SUNICUT® 5534 ends your search for a single cutting oil that can assure quality machining of a wide variety of ferrous metals...ranging from B1112 to 4130 and including free-machining stainless steels.

A non-emulsifying, transparent cutting oil, Sunicut 5534 can speed production of general screw machine and turret lathe work. It gives excellent finish in tapping, drilling, threading, and light stamping operations and can be used on many special jobs run at both high and low speeds.

Try moderately-priced Sunicut 5534. It can save you money by reducing your cutting oil inventories and oil change time. It can boost your production and profits.

For detailed information, prices and delivery data about this new, versatile cutting oil, call your Sun representative today. Or write directly to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. **IA-3.**

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Imports Hurting U.S. Builders

Association Says They Threaten U.S. Security

NMTBA spokesman tells Congress imports are 30 pct of domestic output.

Lower costs overseas are blamed.

Broader tariff powers are asked to keep U.S. industry healthy and protect national security.—By E. J. Egan, Jr.

▪ Several factors contribute to the unhappy business situation U. S. machine tool builders find themselves in. One of the most worrisome is the matter of machine tool imports, which now amount to an estimated 30 pct of domestic production.

One of the serious implications is the threat to our national security. This grim picture was recently presented in Washington before the House Committee on Ways and Means, on the extension of the Trade Agreements Act. Detailing the views of the National Machine Tool Builders' Assn. was J. Herbert Myers, manager of overseas operations for The Cincinnati Shaper Co.

Survival in Doubt—"Many companies manufacturing general purpose machines are facing serious difficulty," he explained. "Some of them may not be able to survive."

He reminded the Committee that "guns, aircraft, ships and new missiles have to be made on machine tools, and so without machine tools we should be unable to defend ourselves. If we are to compete with the Soviet Union in the race for space and world leadership we must have modern machine tools and a strong machine tool industry."

Price Problem—It's not that foreign tools are better than American machines. They're just cheaper—a lot cheaper. The root of the whole problem is the difference between wages paid by U. S. builders and their overseas competitors. That, plus the fact that U. S. import duties aren't high enough to offset the difference in labor costs.

Some U. S. companies, with operations abroad, have been reluctantly considering exporting a part of their foreign production back to the American market. It would be one way to compete on more even terms with their overseas rivals.

Security Threat—"In terms of national security, this possibility poses a serious problem," Mr. Myers warned. "We obviously cannot concentrate our productive capacity in Europe where it might be swept up in a Soviet march to the coast."

U. S. builders have no argument with the long-range advantages of reciprocal trade. "But as to machine tools, the U. S. tariff is by no means the equivalent of the various foreign trade barriers," Myers said.

Shaping Train Blocks Train-Style

THREE AT ONCE: Diesel engine block weldments are shaped to precise dimensions on this 40-ft planer at ALCO Products, Schenectady.

INDUSTRIAL BRIEFS

More Hot Metal—A contract for an electrostatic precipitator has been awarded to Koppers Co., Inc., by U. S. Steel Corp. for installation on the No. 2 blast furnace at the latter's Youngstown, O., works. New unit will be designed and fabricated at Koppers' Metal Products Div. in Baltimore. Koppers is also engaged in construction of a precipitator for the No. 4 furnace at the Youngstown plant.

Bronze Bearing Institute—Producers of cast bronze bearings have recently formed The Cast Bronze Bearing Institute. Purpose of the Institute is to promote the use of cast bronze bearings and bushings through research, development, education, and promotion. Founding firms have subscribed $1000 each to start the CBBI research program immediately at the Franklin Institute in Philadelphia.

Yes, SIR—A new gyroscope for guided missiles and military aircraft has been developed by Westinghouse Electric Corp., Baltimore, Md. The gyro is designed to measure the turning rate of an airborne missile or aircraft in relationship to space. It is known as SIR-1—subminiaturized integrating rate (gyro), model one. The device weighs less than 7 oz and is about the size of an ordinary flashlight battery.

Missile Business—An $8 million contract has been awarded to Convair, Div. of General Dynamics Corp., Pomona, Calif., by the Navy. Contract is for pilot line production of TARTAR guided missiles, which is the newest and smallest of the Navy's guided missiles in the surface-to-air category. It is designed for use from ships as small as destroyers and for secondary battery use from cruisers.

For Advanced Study—A new research and development building will be erected at The Cleveland Crane & Engineering Co., Wickliffe, O. The facility will include a modern equipped air conditioning engineering department and complete shop and testing facilities for assembling, handling and testing equipment under development.

Power - Packed — Westinghouse Electric Corp. will manufacture a turbine generator for Union Electric Co., St. Louis. It will produce as much power as the utility's entire generating system did before World War II. The unit is valued at over $10 million, and is scheduled for operation in the second quarter of 1961. Initial delivery of components will start in the spring of 1960.

Iron Ore—The drop-off in steel demand is reaching back into the mines and hurting ore production. Underground operations which usually are continued through the winter to stockpile ore have already been cut back. Lower lakes ports have large stocks and a slow shipping season is in prospect for 1958. Operations at taconite pellet mills, however, are still high.

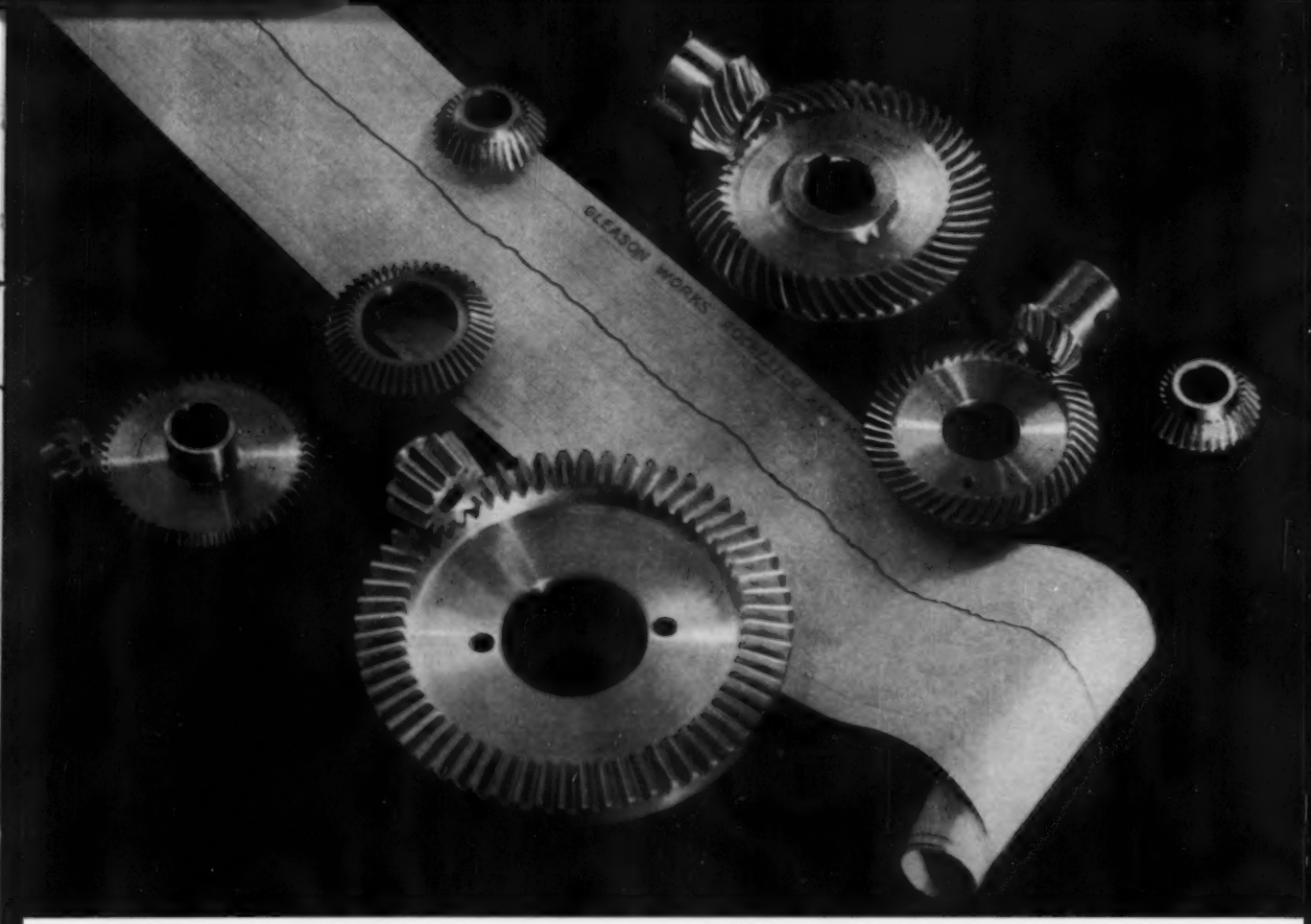
Mirro Expands — Loewy-Hydropress Div. of Baldwin-Lima-Hamilton Corp., New York, will build rolling mills for Mirro Aluminum Co., Manitowoc, Wis. Order covers equipment of a complete new rolling mill plant which Mirro will build on a 104-acre tract located on the shore of Lake Michigan between Manitowoc and Two Rivers, Wis. This multi-million dollar installation consists of a two-high reversing hot mill, a four-high non-reversing cold mill, and a Loewy-Hydromil for high-speed production of aluminum foil.

Stainless Tug—The second new stainless steel-hulled diesel towboat has been added to U. S. Steel's river fleet at Clairton, Pa. All parts of the boat exposed to water from the main deck down are of stainless steel. The 120-ft long craft was named for Stephen M. Jenks, U. S. Steel's administrative vice president —central operations. Designed by the St. Louis Shipbuilding & Steel Co., The Jenks has a 27 ft beam, measures 9 ft in depth with a draft of 6½ feet.

First Batch—Columbia-National Corp., Cambridge, Mass., has shipped its first lot of nuclear-grade zirconium sponge to the Atomic Energy Commission. The company holds a $22.7 million contract to supply 3,500,000 lbs of zirconium to the AEC over a 5-year period. Most of the metal will be used by the government in the construction of reactors for the Navy's atomic-powered fleet.

Sweet or Dry?—Two new steel barges have been launched by St. Louis Shipbuilding and Steel Co. at Paducah, Ky., to transport bulk wine for the Italian Swiss Colony Co., California. Each barge has some 18,000 sq ft of surface area with 11 separate tank compartments for a total liquid capacity of 300,000 gallons in each barge. Contamination of the cargo and damage to the tank compartments is safely controlled by special tank linings developed and installed by Lithcote Corp. of Chicago and Norwalk, Conn.

Welding Contest — The Resistance Welders Manufacturers' Assn. will sponsor a contest on development and research in the field of resistance welding. $2000 in prizes will be awarded for winning papers in Special Projection Welding or General Resistance Welding classifications. The contest closes Sept. 15, 1958. Applications should be received by July 1.



For *the best* in fine pitch gearing...

Gleason Works now offers complete production and testing facilities for *any* fine pitch spiral bevel, hypoid, Zerol® or Coniflex® gears.

Bevel gears produced and tested with Gleason equipment assure the highest degree of accuracy obtainable in angular motion transmission. And, with the new methods and improved design incorporated in these Gleason machines, fine pitch gears can be produced at a lower cost than ever before!

Generators and grinders

Three Gleason Generators cover the entire field of cut fine pitch bevel gears up to 4½" diameter. These include the No. 2A, 103 Straight Bevel Coniflex Generators, and the No. 2 Hypoid Generator. All three are automatic machines for jobbing or high-speed production and will improve quality besides increasing production.

For the ultimate in durability and accuracy, hardened fine pitch bevel gears are ground in the No. 105 Straight Bevel Coniflex Grinder or the No. 7 Hypoid Grinder. These Grinders are completely automatic wet-type, high-speed machines.

In gear manufacturing, testing is just as important as the actual gear cutting or grinding. One Gleason Tester—the No. 104 Hypoid Tester—checks the running qualities, tooth spacing and concentricity of gears up to 4¼" diameter.

An important new feature of the No. 104 is the provision for recording the rolling test on paper, giving a permanent record of tooth to tooth composite error. An electronic pickup head for a recorder is furnished, and the recorder itself may be engaged or disengaged, as required.

Engineering services available

Cutter sharpeners and complete tooling are available to suit your requirements. In addition, the services of the Gleason Engineering Department are at your disposal, at no obligation to determine the best fine pitch gears for your application and the machinery required to produce them. Write for further information.

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Carl Schonhoft, appointed manager, grinding machine sales, Cincinnati Milling & Grinding Machines, Inc.; **Curtis Altbaier,** appointed manager tool sales.

G. M. Stickell, elected president and general manager, Landis Machine Co., Waynesboro, Pa.

D. E. Lemster, appointed superintendent, production planning, Olin Aluminum division rolling mill, Olin Mathieson Chemical Corp.; **J. M. Welch,** appointed director, field sales, Olin Aluminum Div.

F. W. Browne, appointed district manager, West Coast territories (California, Oregon and Washington) The Warner & Swasey Co., Cleveland.

J. C. Hicks, appointed director, research, Kaiser Chemicals Div., Kaiser Aluminum & Chemical Corp., Oakland, Calif., headquarters.

A. S. Marvin, appointed vice president, engineering, American Bridge Div., U. S. Steel Corp.

A. O. Fulton, Jr., promoted to executive vice president, Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.; **N. N. Brown,** named vice president; **R. M. Powers,** appointed district sales manager; **J. J. Humphreys, Jr.,** promoted to district manager, orders.

Lew Murray, appointed manager, Contract Dept., Clearing Machine Corp., Div. of U. S. Industries, Inc.

W. H. Heath, appointed asst. general sales manager, Disston Div., H. K. Porter Co., Inc.

R. J. Dilger, appointed director, purchases, Tube Turns, Louisville, Ky., Div. of National Cylinder Gas Co., Chicago.

J. H. Elliott, appointed chairman of the board and vice president, Landis Machine Co., Waynesboro, Pa.; **R. E. Yingling,** named director, sales; **D. R. Stoner, Jr.,** named domestic sales manager; **A. R. Margin,** appointed asst. export manager; **L. M. Hess,** appointed treasurer and asst. controller; **L. H. Randolph,** appointed works manager, main plant; **F. Nell,** appointed works manager, Tap Div.; **R. I. Eyler,** named plant engineer.

F. K. Goodell, appointed chief engineer, American Bridge Div., U. S. Steel Corp.; **K. D. Cunningham,** named district engineer; **O. H. Ormsby,** named asst. district engineer.

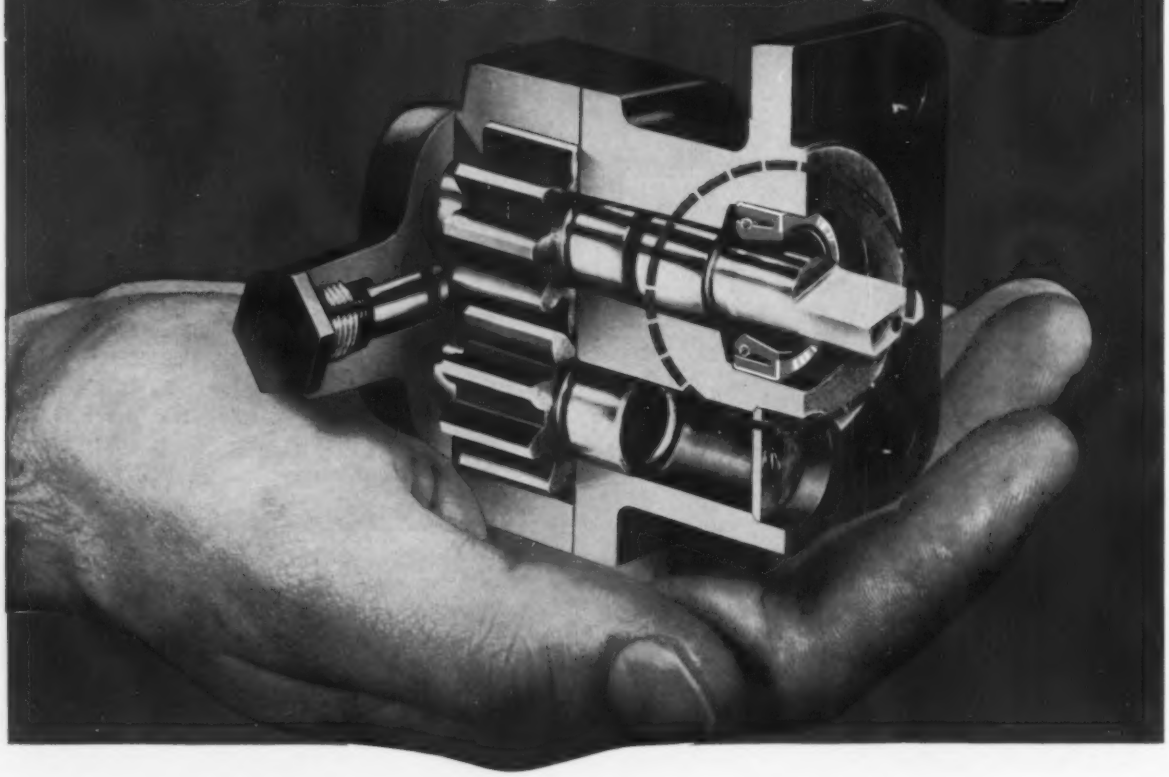
K. F. Potter, named director, engineering, American Hoist & Derrick Co.

F. C. McGough, appointed superintendent, Fuel and Power Dept., Chicago district, The Youngstown Sheet & Tube Co., E. Chicago, Ind.

P. F. Lee and **R. V. Wilson,** promoted to assistant to the director, purchases, The Anaconda Co., New York.

R. G. Lynn, named chief electrical engineer, American Hoist & Derrick Co., St. Paul, Minn.; **A. W. Brown,** promoted to chief mechanical engineer; **J. J. Hite,** named principal consulting engineer.

Champion performance in a fist-sized pump...sealed by C/R



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CHICAGO RAWHIDE

Complex Drawings: 3-D Makes Them Clear

By P. F. Boehm—Technical Consultant, John R. Cassell Co., Inc., New York

Busy drafting departments have two big problems. One, to make engineering drawings clear to all concerned. Two, to keep up with the work load.

The solution for many firms is to use more 3-D illustrations. They're readily understandable, even to non-technical personnel. And they're quick and easy to make.

▪ In a broad sense, engineering drawings constitute a "picture language." As such it should be understandable, without words, to executives, engineers, shop workers, and even to non-technical people. Does conventional drafting fill the bill?

Orthographic projection as used in conventional blueprints conceives an object positioned with one main face parallel to the drawing surface and projected onto it by parallel rays perpendicular to that surface. Such drawings usually show views of at least three (sometimes all six) of the object's principal faces.

Engineers and draftsmen have been loyal for a long time to the orthographic or three-view method. Actually, it is not an inconvenient technique for the designer-draftsman who can rotate his creation in his mind's eye to see it from all six sides.

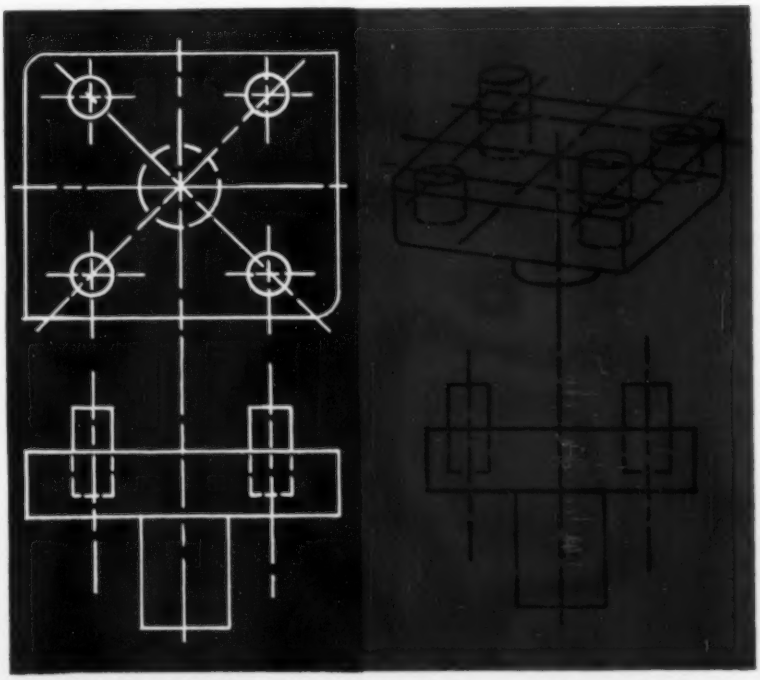
Hard To Read—But the reader of orthographic drawings has a tough problem: to integrate three or more different plane views into the concept of a three-dimensional object. Moreover, trained blueprint readers are decreasing in number, even as modern technology forces more complex parts and assemblies to be pictured in engineering drawings.

Then, too, more and more drafting departments are being considered as part of the production team. As such, any backlog of output due to a shortage of draftsmen or an overload of work must be countered by better methods and more efficient tools, exactly as in the plant.

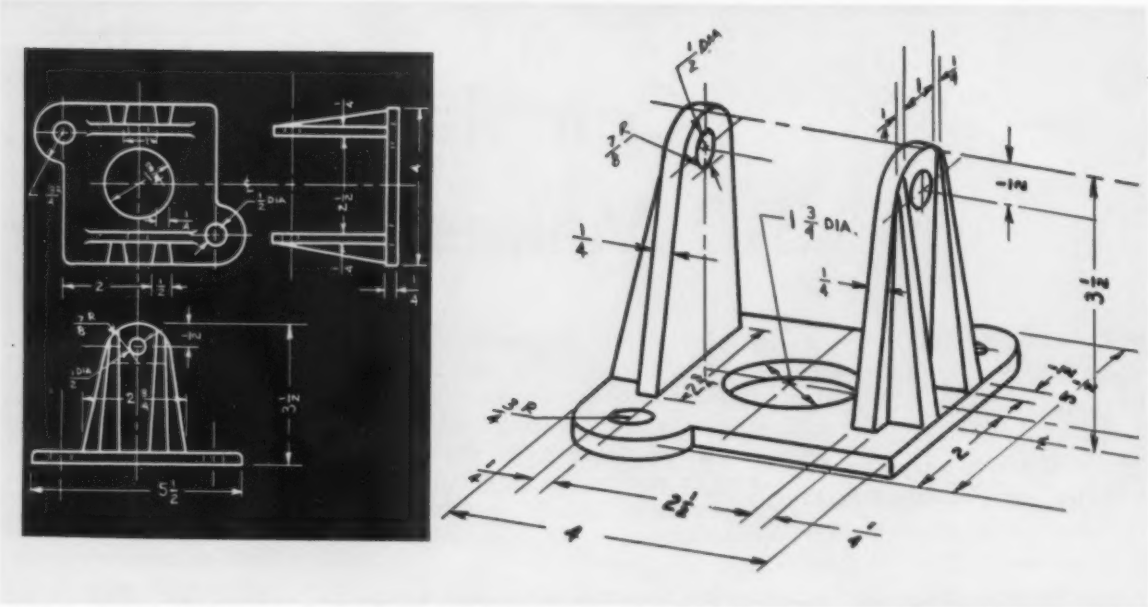
Efforts to develop simplified drafting practices have not met with universal approval. The reason: People must be trained anew to understand these forms of drafting "shorthand."

Need Better Pictures—The ideal solution to the communication problem in engineering drawings should be a more convenient "picture language"; more convenient for those who want to express ideas, and also for those who must read and understand them.

All things considered, it seems that the best and most promising answer is to adopt three-dimension-



MAKING IT CLEAR: Conventional front, top and side views don't show which inserts are flush and which ones extend above the horizontal plate. Adding a dimetric 3-D drawing (top right) makes it clear.



ONE FOR THREE: It doesn't take long to dimension a 3-D drawing to interpret or even replace the usual trio of plane views.

al drawings on the largest possible scale.

A 3-D drawing simply shows three main faces of the object in one view, thus replacing the three separate views of the conventional technique. If all six principal faces of an object must be shown, two 3-D drawings will suffice. The advantages are many: ready understandability, plus savings on time, drawing size, paper and reproduction costs, storage and mailing costs.

Dimensions No Problem — Of course 3-D illustration permits of dimensioning and sectioning exactly as is done in orthographic drawing. Another well established and sound use of the 3-D technique is for exploded views of complex assemblies.

Careful tests have proven again and again that good and readily understandable one-view 3-D drawings can be made in about half the time needed for the corresponding three orthographic projections.

This time-saving feature is not surprising. Consider, for example, that every element (corners, planes, edges, centers) of a conventionally-drawn object must be shown twice or three times in the total of three views: a corner point in one appears as a line in the other two views, and so on.

Why Invite Errors?—Locating these correlated picture elements and shifting them from one view to another takes time. It also invites errors, erasures and corrections.

All this is eliminated in the one-view 3-D method, in which every element of the drawing occurs but once. Therefore, any engineering changes need only be made once.

It cannot be argued that a draftsman trained in orthographic projection would find it hard to switch to the one-view 3-D technique. After all, every draftsman is well trained in making auxiliary views. These are simply orthographic projections of an object that has been rotated through a chosen angle about an axis in the picture plane.

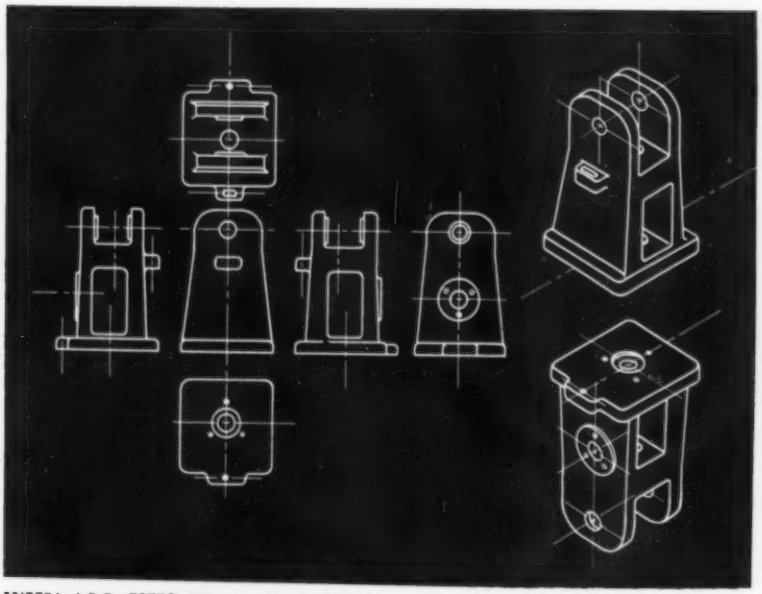
No Big Change—It is only a small step from this auxiliary technique to the 3-D method which turns the object about two axes in the picture plane and then projects it orthographically. Moreover, most draftsmen are quite familiar with isometric drawing which is a typical example of the 3-D method.

Actually there are a number of 3-D techniques, including perspective and oblique projection. However, these two are not well suited for general use in industrial drafting departments.

The Best System—Fortunately, though, projective geometry does include a precise, scalable, and pleasant-appearing type of 3-D illustration: the axonometric projection. This system, which includes isometric, dimetric, and trimetric techniques, is just a different application of the orthographic method. Drawings are similar to pleasantly natural perspective views except for the fact that parallel lines do not converge to a vanishing point.

Isometric drawings, in which all three axes are scaled equally, are quite useful for many simple cases. The trimetric technique is not generally recommended because three different scales are needed for all lines, ellipses, and angles shown in the single 3-D view.

Dimetric Is Tops — Dimetric drawings, however, are superior in appearance to the other two forms. They can be made at either one of two selected scale ratios: 1:1:0.5, or 1:1:0.632. They offer the advantage



WHY ALL SIX?: Two well-chosen isometric views (right) instantly convey the shape of an object that an untrained blueprint reader might find hard to visualize from the six plane views.

of emphasizing or favoring one face of the object. Thus more details or dimensions may be shown at two scales with minimum foreshortening. At the same time the third face, with its lesser detail, can be shown in a condensed form by using the smaller scale.

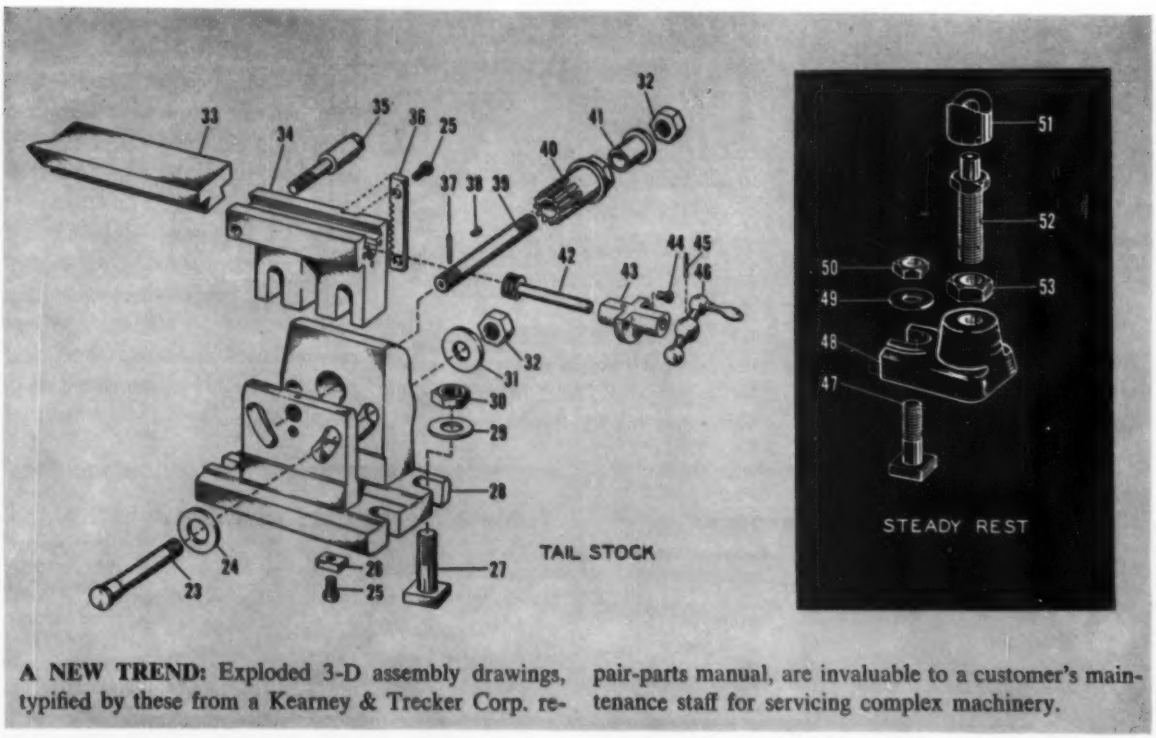
Isometric and dimetric drawings can be made quickly and easily with special equipment designed for the purpose. Proper scales, templates, and protractors, such as those made by the John R. Cassel Co., Inc., New York, are readily available.

Special isometric and dimetric graph sheets, for sketching and layout work, are also available. Grid lines on these sheets do not show up when drawings are reproduced.

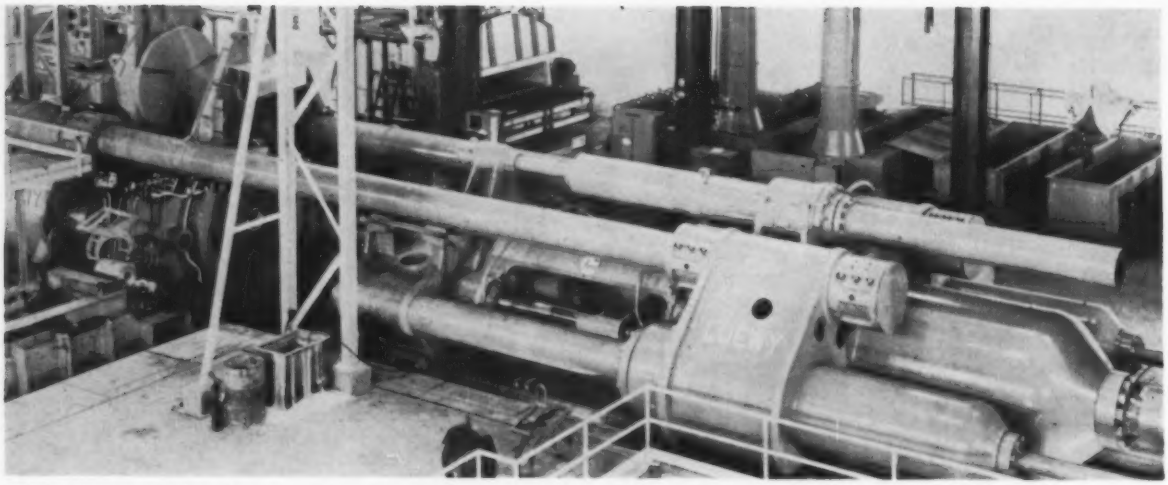
Some firms start adopting the 3-D technique in a very practical and successful way. They specify that a one-view 3-D picture, often done to a smaller scale, be added to every conventional three-view drawing of all except the simplest objects. Thus at first glance the 3-D illustration conveys the exact nature and form of the object.

This system is an effective transition step from the exclusive use of conventional three-view drawings to the ultimate goal: the use of one-view 3-D drawings wherever a clearer "picture language" is needed.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.



A NEW TREND: Exploded 3-D assembly drawings, typified by these from a Kearney & Trecker Corp. repair-parts manual, are invaluable to a customer's maintenance staff for servicing complex machinery.



KING-SIZE: Horizontal extrusion press at Curtiss-Wright's Metals Processing Div. has 12,000-ton capacity.

Titanium Extrusions Cut Production Costs

By **N. J. Feola**—Project Specialist, Wright Aeronautical Div., Curtiss-Wright Corp., Wood-Ridge, N. J.

The way to drastically cut the cost of titanium parts is to stop wasting titanium.

Extrusion techniques plus the use of cast titanium ingot provide a two-way cost reduction program for titanium parts of top quality.

■ The high strength-to-weight ratio of titanium and titanium alloys offers a considerable weight advantage in aircraft applications. But this advantage has been greatly hindered by the cost of finished titanium parts.

In fact, using conventional steel manufacturing methods, the cost of titanium parts sometimes has been as much as ten times greater than the cost of steel counterparts. This high premium reflects both the cost of titanium and the conventional manufacturing methods used to make finished parts.

Weight Saving — Such methods generally result in low material utilization factors. By material utilization factor is meant the ratio of finished part weight to the raw material weight. The Curtiss-Wright Corp. recently developed a production manufacturing method that reduces finished part costs by providing high material utilization.

The new method makes use of the extrusion process as the primary metalworking operation. To demonstrate the process, typical titanium annular rings were manufactured in unalloyed titanium (A70) and the 5 pct Al-2.5 pct Sn titanium alloy (A110AT). Thanks to extrusion, only one-half the amount of raw material (in the form of cast ingots) was needed to complete the finished part. Additional savings resulted from extruding these sections from cast ingots rather than forged billets.

Table 1 | Dimensions vs. Tolerances

Nominal Metal Dimensions	Extrusion Tolerance
Less than 1.00 inch	±0.020 inch
1.00 to 2.00 inch	±0.030 inch
2.00 to 3.00 inch	±0.040 inch

Table 2 | Properties of Extrusions

	A70	A110AT
Tensile Strength (psi)	100,000	135,000
0.2% Yield Strength (psi)	80,000	120,000
Elongation (%)	25	20
Reduction in Area (%)	40	35

Large Capacity—The cost-saving extrusion studies, sponsored by the Air Materiel Command, were run on a 12,000-ton horizontal extrusion press located at Curtiss-Wright's Metals Processing Div., Buffalo. This machine is equipped with containers that permit extrusion of stock ranging in diameter from 8 to 24 in. Corresponding to the containers are pressure stages of 4,000, 8,000, and 12,000 tons.

For the present tests, the 4,000-ton pressure stage and 8-in. diam container were used exclusively. Extrusion stock was heated in a barium chloride salt bath located adjacent to the press. Rapid transfer of the billet from the bath to the extrusion chamber was handled by an overhead hoist.

Some Variables—Cross-sectional views of the flanges studied are shown in Fig. 1. In extruding these cross-sections, stock was added in the form of a circumscribed envelope. This envelope (about 0.050 in. thick) not only accounts for the tolerances required for the extrusion operation, but also represents the extra stock needed to permit machining to finished dimensions after welding, rolling, and sizing.

To determine the portion of the envelope required solely by the extrusion process, a check of extrusion processing variables was made on round sections. The object was to combine lowest tolerances with maximum extrusion yield.

Holds Tolerances—These conditions result in an extruded product for both the alloyed and unalloyed titanium with tolerances that are given in Table 1. This dimensional control can be maintained for lengths of 100 linear feet for the unalloyed material and 15 linear feet for the alloy. Length limitation is a direct function of die wear.

FIG. 1: Detail cross-sections of several titanium flanges produced to illustrate versatility of process.

The difference in die life for the two materials is an indication of the greater resistance to deformation afforded by the titanium alloy. A similar increase in extrusion pressures resulted from extruding this material, despite the higher extrusion temperature required (1850° vs 1550°F for unalloyed titanium). High pressures limited the range of extrusion temperatures and reductions obtainable with the alloy.

Ingot's Virtues—Substantial cost savings result from utilizing cast ingots for the extrusion stock. Conventional extrusion practice calls for a billet forged from an ingot to fit a specific container diameter. By extruding directly from a cast ingot, both the cost of forging and the material lost in this operation are eliminated.

Extruding the cast ingot pioneered a new technique. But in line with aircraft requirements, considerable development was needed to confirm the quality of such extrusions. Typical mechanical properties for these extrusions are listed in Table 2.

Hot Extrusion—What are the effects of extrusion temperature? For the materials tested, extruding above the beta transus (unalloyed titanium: 1625°F, titanium alloy: 1930°F) can result in severe loss of ductility and subsequent embrittlement.

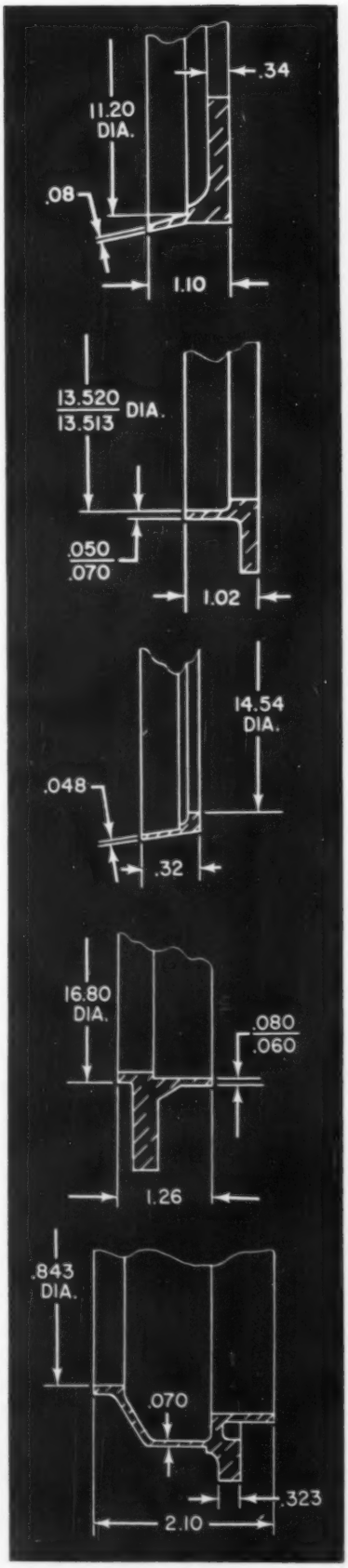


Table 3 | How Extrusion Cuts Costs

Manufacturing Method	Conventional Forging	Extrusion	
		Forged Billet	Cast Ingot
Material Utilization	19	26	30
Part Cost, $/lb	72	48	43
Cost Savings, pct	—	33	40
Procurement Cycle, months	6	5	4

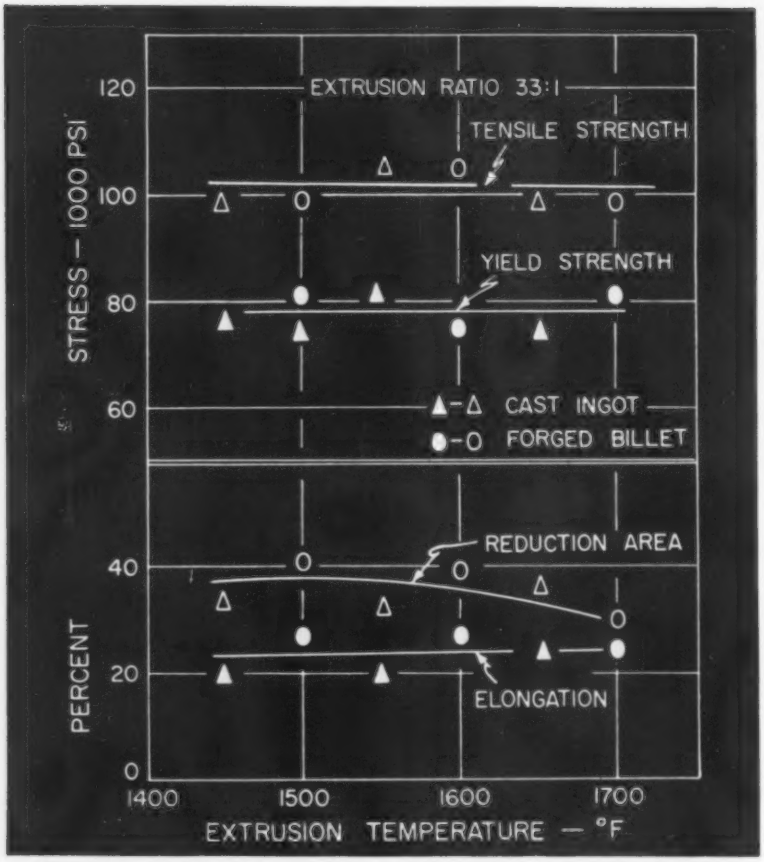


FIG. 2: Comparison between the tensile properties of A70 titanium extrusions made from cast ingots and forged billets.

These temperatures, therefore, represent an upper limit. The lower limit for extrusion temperature is established by the pressure requirements.

To further demonstrate the high quality of cast ingot extrusions, a comparison was made with extrusions from forged billets. The results are shown in Fig. 2.

Extruded shapes were formed into 360-degree rings on a Bath Radial Draw Former. This machine consists of a power-driven circular table and a double-acting pressure-controlled cylinder. Where required, a hydraulic ram—capable of applying a side force to the section being formed—is used.

Hotter for Alloy — Heating of both dies and material was required to form all of the shapes in both materials. The A70 material was heated to a range of 700°-1000°F, and die temperature was held at about 800°F. Titanium alloy temperature ranged from 1200° to 1400°F. Required die temperature was 1000°F.

The specific temperature required for each of the rings was found to depend on the complexity of the cross-section and the ring diameter. Temperatures required to form A11OAT rings were generally higher than those needed for the unalloyed titanium. Forming at too low a temperature resulted in tearing at the tensile side of the ring.

In all cases, better results were obtained when the forming operation proceeded as slowly as possible. A two-pass operation—working first with clockwise rotation of the table and then with a counter clockwise rotation—produced the best results.

Two Welders Used—Welding of the formed titanium rings was performed by two welding sources. One machine was rated 250 KVA, with a maximum clamping force of 23,000 lb, and a maximum upset force of 32,000 lb. A larger machine was rated at 600 KVA, with a top clamping force of 160,000 lb, and a maximum upset force of 200,000 lb.

Tests were run on machined bar stock to determine the range of rib ratios which could be flash butt welded and still meet strength and ductility requirements. High quality welds were obtained for rib ratios (ratio between thick and thin leg of a complex cross-section) as great as 5.3 to 1. This ratio is considerably larger than that occurring in any of the rings produced as a result of the test program.

Careful Sizing — All titanium rings were expanded on a 225-ton press brake. As required by specification AMS 7498, the sizing temperature range of from 700° to 1250°F was used for both materials. This temperature permitted an expansion of 2 pct and 1½ pct for the A70 and A11OAT materials, respectively.

For the small diameter, large cross-section rings, an out-of-round condition resulted from welding. Prior to sizing these rings, a rolling operation was performed to restore the ring concentricity.

Actual Savings—The high utilization associated with extrusion, coupled with the use of cast ingots, resulted in an appreciable reduction in costs as compared to conventional forging techniques. For the variety of shapes examined, cost savings were generally on the order of 25 pct. In some instances, savings were as high as 40 pct. In addition the procurement cycle for the detail parts was reduced by 30 pct.

These figures do not include the savings for machining. Extruded rings require only about one-half the stock removal of conventionally forged sections. In general, this means an additional saving of from one-quarter to one-third of the machining costs.

Uses Broaden for Vacuum Metallizing

Vacuum metallizing is emerging as a full-blown finishing method that's functional as well as decorative.

Once limited mostly to novelties and a few industrial specialties, its possible uses go well beyond toys and vacuum tubes.

▪ Tough-surfaced vacuum metallizing turns out to be a low-cost finish for automotive parts. It's a simple production process giving a lustrous metallic finish.

Until recently it has been applied mostly to such industrial parts as selenium rectifiers and precision lenses, or on decorative and novelty items. One of the first to adapt the method for both functional and decorative purposes is the Ford Motor Co.

Production Unit—At its Accessory Division's plastic molding plant, Brooklyn, Mich., the company uses a 48-in.-diam metallizer made by the Vacuum Equipment Div., F. J. Stokes Corp., Philadelphia. The unit applies a thin layer of aluminum to acrylic and styrene parts, such as lenses for back-up lights, heater opening covers, and horn-button medallions.

The parts, supported on racks, are rolled into the vacuum chamber of the metallizer along with a small amount of the plating metal. As soon as the desired vacuum has been reached, the plating metal is heated to its vaporization temperature by resistance heating. Vaporized metal deposits by condensation on the parts, even though the parts have no electrical polarity.

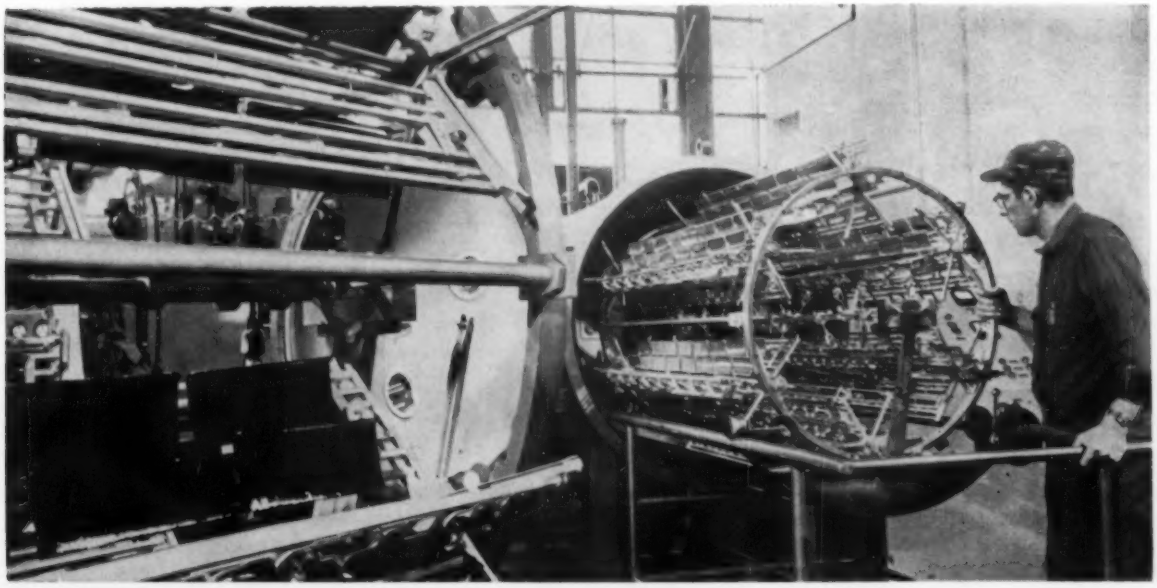
Use Second Surface — Made of clear acrylic plastic, the back-up light lenses are metallized on the inner or protected "second" surface. The metallizer handles 432 lenses per load. Back coating completes the job, leaving a glossy chrome-like finish on the visible surface.

The heater-opening cover, made of styrene, is base lacquered, baked, metallized, top lacquered, and given a final bake. The top coat of lacquer is tinted lightly to resemble chrome. Here, 288 parts are processed per load.

To give a three-dimensional effect, the horn button medallion is also second-surface metallized. In this case metallizing covers a gold beaded lacquer, and is followed by a back-up coat that is air dried. Close to 1000 medallions are processed per load.

Versatile Method—Aluminum is most commonly used because it's most easily vaporized. Further, the deposited metal has the same color as polished platinum, rhodium or chromium.

Metals can be vaporized on many materials ranging from metals, plastics and glass to cloth, paper and wax.



ENTER THE LOAD: Operator rolls rack with heater covers into vacuum chamber of 48-in.-diam unit.

NO TROUBLE TO DOUBLE: Machine enables operators to solder 5000 lures per day instead of 2400.

Machine Soldering Cuts Costs, Doubles Small Shop's Output

By **Robert Mortensen**—President, Louis Johnson Co., Highland Park, Ill.

Small shops keep finding ways to mechanize slow and costly manual operations.

This one replaced hand soldering irons with a small machine.

The result: several important cost-saving benefits.

▪ Profitable investment in automatic processing equipment poses special problems for the small manufacturer. For example, is production high enough to warrant the expense? The degree of mechanization is another problem, important from several standpoints: labor requirements, material savings, size of the investment itself—even the intangible factor of employee relations.

To reach the best investment decision, the small manufacturer should combine his own ideas with the equipment maker's special knowledge. The point is well illustrated by the thinking that led the Louis Johnson Co. to install an automatic soldering machine in its Highland Park, Ill., plant. The machine paid for itself in 13 months.

The firm makes sports fishing tackle. One of its chief products is a spoon-type lure; a teardrop-shaped copper or brass piece to which a copper plated steel fish hook is soldered.

Joined by Hand — Two women formerly did this soldering using hand irons. Each would place five spoons and hooks in a fixture and then solder the assemblies. Top production for the two-woman team was 2400 lures per day.

The system was not considered very efficient. For one thing, the reject rate was high. Also, supervisors frequently had to interrupt other work to dress and re-tin the soldering irons. In addition, operators needed a week of training before they could solder at top speed. And with the usual turnover for such workers, training costs assumed extra importance.

More Than Double—Thus management decided to look into mechanized soldering setups, aiming at 5000 lure assemblies per day with the same two operators. Runs of 25,000 to 50,000 pieces turned up often enough to warrant machine soldering at this rate.

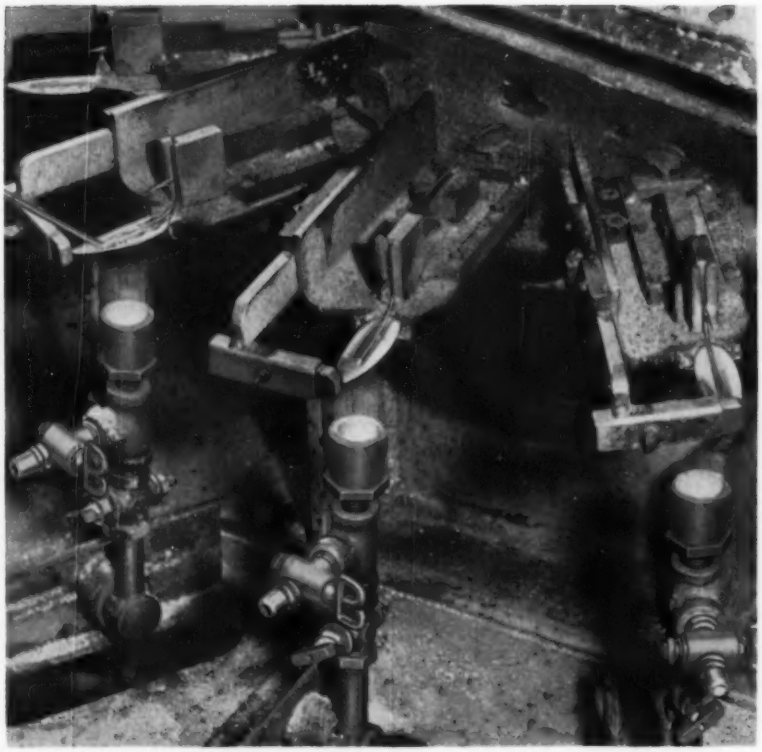
The problem was turned over to the Selas Corp. of America, Dresher, Pa. After a series of laboratory tests to check out heating and cooling cycles and other factors, Selas designed and built a machine to do the job.

It consists of a 12-station indexing turntable with fixtures that adjust easily to take various sizes of lures. Under each of three stations an air-gas burner fires upward at the pre-positioned assemblies. At three succeeding stations jets of air cool the soldered workpieces so they can be removed by hand. An electric timer mounted in the machine base controls the indexing cycle.

Need Little Training—The machine effectively paces the two operators who adapt to its operation with very little training. One woman assembles hooks and spoons into the fixtures as they index into position at the front of the machine. The other woman, seated at the opposite side of the machine, hand feeds wire solder to the heated work and also removes the completed assemblies.

Controlled heat, a uniform heating and cooling cycle, a fixed relationship between the burner and the spoon-and-hook assembly — all of the skills essential to a good soldered joint are built into the machine. As a result, rejects are negligible. A 42 pct saving per lure is attributed directly to the machine-soldering technique.

The machine can be quickly adapted to meet changing production requirements. Preplacement of solder can be substituted for the hand feeding operation if it becomes desirable at some future date. Silver soldering can also be done if necessary, simply by making proper adjustments of the fuel mixture and the indexing timer.



JUST HOT ENOUGH: Directed flame for a timed interval insures well-soldered joints, minimum rejects.

THE OLD WAY: Former soldering technique used a five-station fixture, hand irons, was slow and costly.

Jigs and Fixtures: Good Design

By **R. F. Thuma**—Superintendent, Maintenance & Tools, Allis-Chalmers Mfg. Co., West Allis, Wis.

First cost is only part of the picture. Maintenance alone can amount to more if the tool isn't designed to last.

But what really counts is how well a jig or fixture does its job. The big savings are in efficient operation and the least possible wasted motion.

▪ A jig can be defined as a device which physically limits and controls or guides the path of a cutting tool. A fixture, on the other hand, holds the part but allows the tool to take its own path. Basically, jigs and fixtures are built for only two reasons—to make a part at lower cost and to hold accurate dimensions.

In deciding whether or not to use jigs or fixtures, thought should be given to how the part will be made, on available or new equipment; the number of pieces, now and in the future; dimensions and tolerances; and how soon the parts will be needed. Consider, first, the possibility of making the part without tools, and weigh the estimated cost of tools against their advantages.

Start Asking Questions—Once the decision to use a tool is made, a host of other factors come into play. Even a simple operation like drilling holes poses such questions as:

Would a simple drill template do the job? Should a drill jig be made to clamp to the piece? Should the drill jig hold the piece? Would a box jig be suitable? How about a trunion fixture? What type of clamping should be used? How about drill bushings? Should they be slip removable, press fit, headless? Will interchangeable bushings and bushing liners be needed?

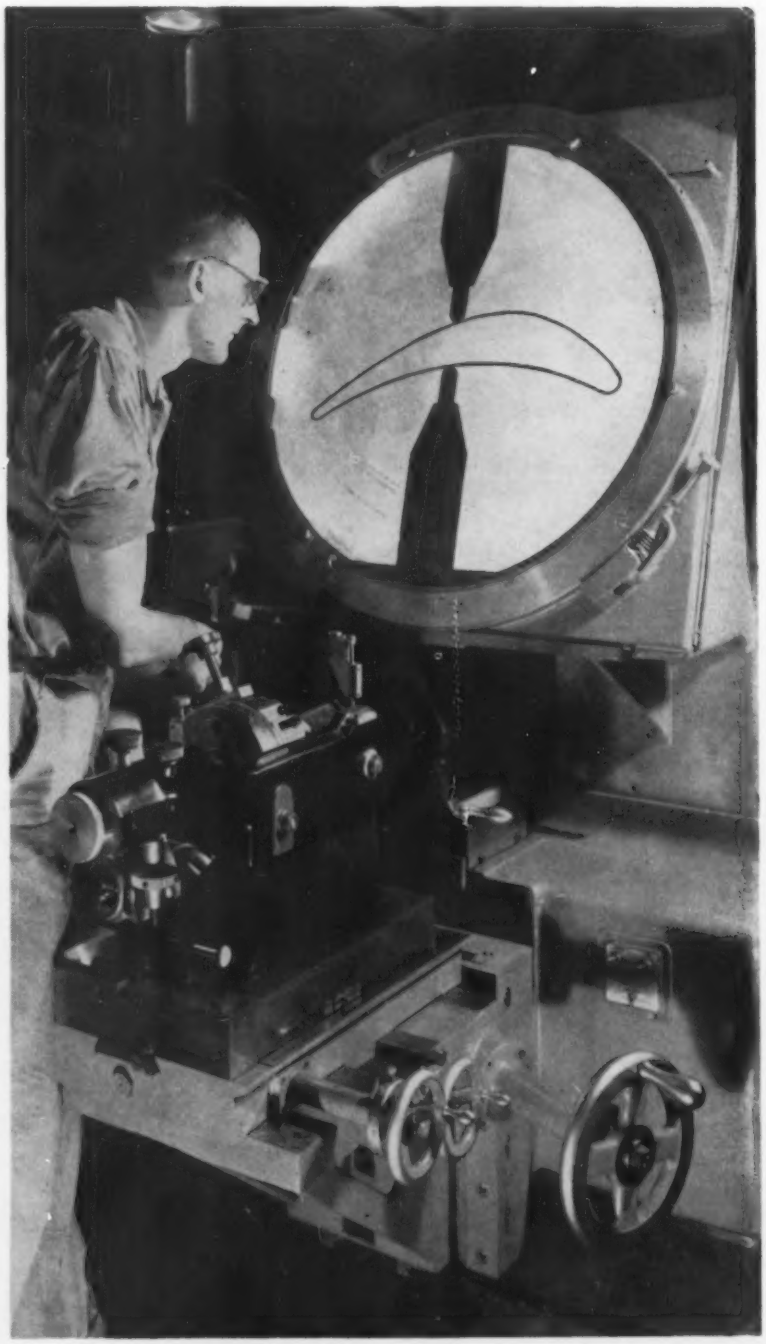


FIG. 1: Actual profile of turbine blade is checked against theoretical tolerances on comparator screen. Optics are finding wider use for gaging, both in precision work and in regular production.

Pays Big Dividends

How about loading and unloading the piece?

The right answers to questions of this kind will help make a good tool at low cost. In addition, it should be designed for ease of loading and unloading, and take into account how cutting oils and coolants will be applied. Coolant can best be provided for when the tool is still on the drawing board, especially on drilling and boring fixtures which may call for holes through tool parts that are later hardened.

Make it Rugged—Maintenance and repair costs can quickly exceed original cost if the tool isn't designed to stand up and stay accurate in production. The tool must be strong enough to hold the part rigidly. Hardened locaters, clamps, nuts and alloy studs will help minimize future repairs. Additional materials costs are minor, and it's usually much easier to add these features at the start than to alter fixtures and add them later.

The same is true of accuracy—it's harder to rework a fixture and try to pick up reference dimensions from battered surfaces. Precision tool tolerances usually require grinding, so the only extra cost may be for hardening the piece. For very close tolerances, it may be necessary to use hardened fixture parts even though production might not require them. But don't make fixture keys hard. It's cheaper to replace keys than to repair machine tables.

Cutter set blocks can be applied to advantage on many tools. Just be sure they are used with a thick enough feeler so there's no chance they'll be struck by cutters. Remember, the tolerance is critical—usually one-tenth of the production tolerance.

Use Standard Parts—Often, jig and fixture costs can be cut by using standard components. They're made by a number of firms. Standard parts might be catalog items, or units you design and buy or build yourself. It may even be advisable to maintain a stock of these parts.

The advent of automation has resulted in development by many fixture producers of components which it was previously necessary to make oneself. These include things like index tables, feed tables, and milling and drilling heads. The list of such items is growing almost daily; one of the best ways to keep posted on what's available is through trade and technical magazines.

It's also important to keep abreast of new materials and methods. Among these are new types of tool and die steels, hard surfacing of parts by carbide spraying, use of carbide cutting tools at speeds of more than 1000 fpm, and use of ceramics, mist coolants and carbon-dioxide.

Optics are Handy — Another practice that's gaining favor is the use of optics for gaging and in manufacturing processes. While the comparator or projector is used mostly for gaging small precision parts, it can also be applied

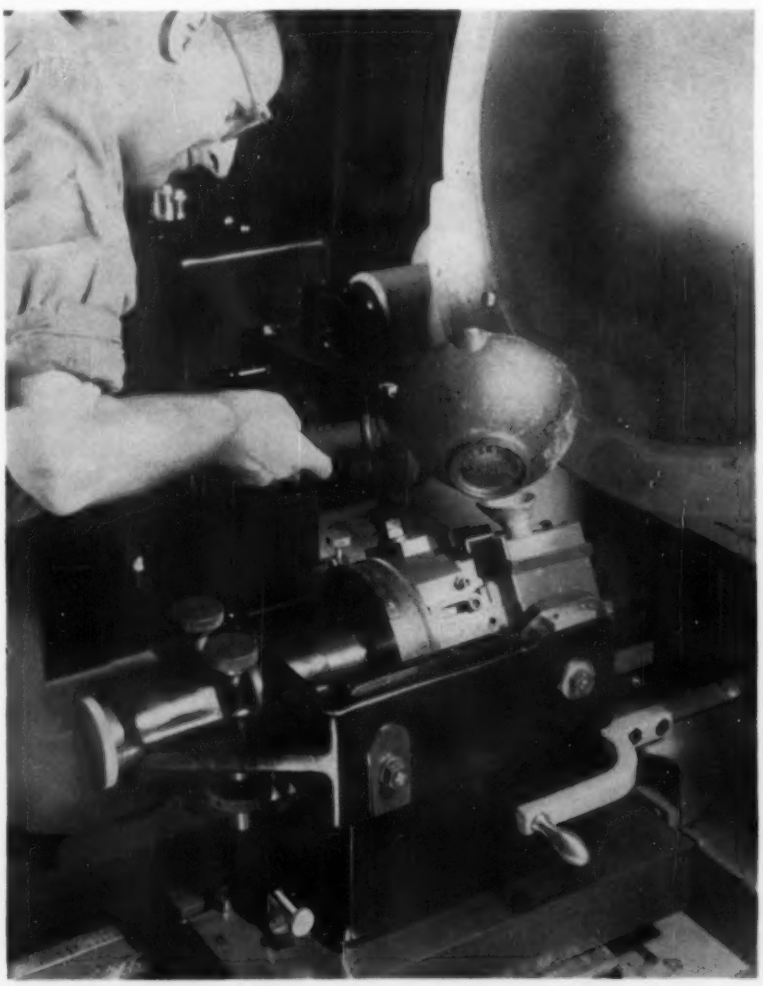


FIG. 2: With a turbine blade held accurately in position on the caparator, hollow precision-ground cast iron block is placed over it and the void is filled with Cerrobond, a low-melting alloy.

to gaging production parts. Usually all that's needed is a layout to the proper magnification and holding fixtures.

Not too many years ago we viewed thousandths of an inch with respect. Now, many parts have production tolerances in ten-thousandths, Normally, 10 pct of the production tolerance can be used for the checking-gage tolerance. But with production tolerances in "tenths" this may no longer be practical. About all you can do is make the gage as close as is practical and live with it. Indicators have helped in many cases, but comparators probably are best.

Comparators have been used at Allis-Chalmers for checking sections of precision cast turbine and blower blades. The actual airfoil was first compared to the theoretical airfoil as in Fig. 1. Then, without removing the blade, it was twisted until the blade form approached its theoretical position. If the blade was acceptable, a hollow precision-ground cast iron block was fitted over it and filled with a soft metal, Fig. 2, which expands as it cools.

Positions Work—In this way the blade could be held accurately in position for subsequent machining, such as crush grinding the axial root to precise dimensions as in Fig. 3. When this and numerous other operations were complete the fixture and blade were simply placed in hot water to melt the alloy, and the fixture was used for the next blade.

With today's emphasis on greater speeds and feeds, designers have to look for ways to make machines produce chips over a greater portion of each cycle. How material is loaded and unloaded offers a big opportunity for savings, especially on short machine cycles.

To reduce that part of the cycle in which the tool isn't making chips, the fixture should be designed so that the piece can fall in and out. Avoid having to remove parts or slip the piece part through holes or under obstructions. Clamps should operate rapidly and be out of the way. Cams, air cylinders, hydraulics and the like will help speed operations.

Cut Waste Motion — Incoming and outgoing material should be located so the operator does a minimum of reaching, turning or bending; motion studies are useful in planning the layout. Special equipment may be needed to handle incoming and outgoing material.

If gaging is required after each operation, find out if it can be done in the future. If not, or if the parts should be gaged during machining, locate the gage for easy access.

And finally, safety is the main consideration before the first line is drawn on a piece of paper. Designers, draftsmen and checkers should be continually reminded of its importance. Use of eye bolts, elimination of pinch points, provision for getting the piece in and out of the fixture without mashing a finger, and removal of chips are items that need careful attention.

Safety is especially important in designing dies, since this is an inherently hazardous operation. Problems that can be solved simply on the drawing board may be difficult after the tool or die is built.

FIG. 3: Iron block containing turbine blade then becomes part of the holding fixture which positions the workpiece for subsequent machining operations—in this case, crush-grinding the root section.

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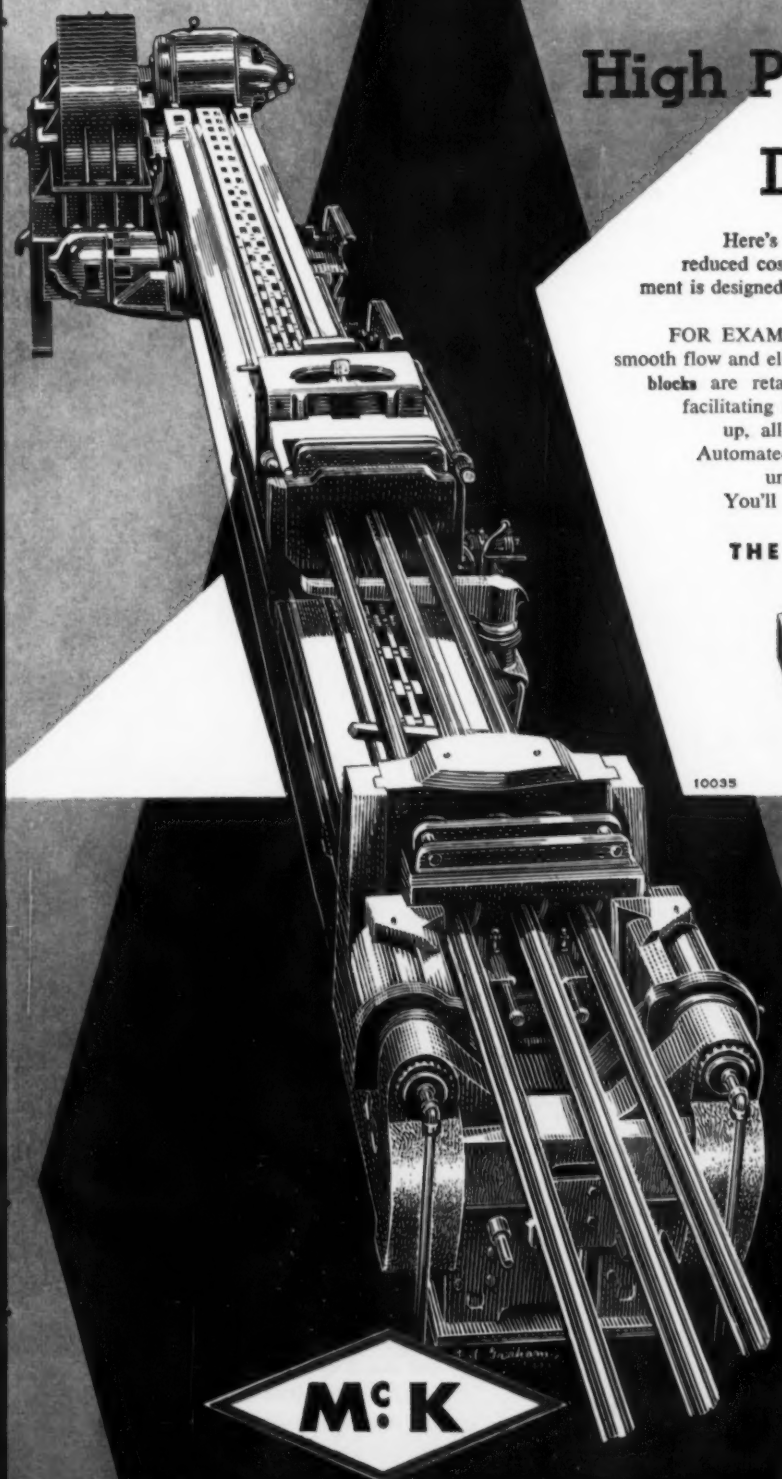

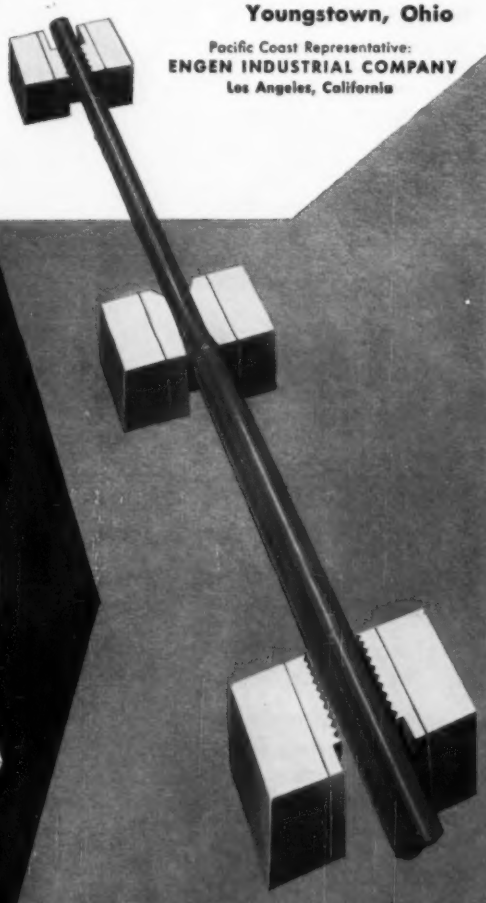

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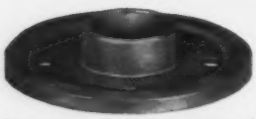

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 109.

Drill Positioner

With a 6000-lb capacity, a new drill positioner accurately handles large weldments for drilling and milling. Rated at 5-in. overhang, 22-in. eccentricity, the table is 7-ft 4-in. diam. A bulletin describes it. (Pandjiris Weldment Co.)

For free copy circle No. 1 on postcard, p. 109

Vacuum Metalizing

Vacuum metalizing (vacuum plating) is described in a brochure as a clean, low cost production technique whose use is rapidly growing as a metal-finishing process for a wide variety of products. Without buffing or polishing, it gives a bright finish on practically any base material. (F. J. Stokes Corp.)

For free copy circle No. 2 on postcard, p. 109

Expanding Collet

Many machining operations can be completed in one chucking with new expandable collets. For precision internal chucking, they can simplify tooling and machining setups. A bulletin explains why. (Hardinge Bros., Inc.)

For free copy circle No. 3 on postcard, p. 109

Pressroom Handler

Automatic pressroom-parts handling is provided by a unit described in a 6-page folder. It loads, removes or transfers any part into, from or to any type punch press. And it's portable, self contained. Still another bulletin, four pages, covers a press hand which "outmodes all other extractors." (Die & Automation, Inc.)

For free copy circle No. 4 on postcard, p. 109

Electrical Alloys

Engineering properties and fabrication characteristics of a new range of alloys appear in a 64-page book. The comprehensive publication covers special alloys for electronic, magnetic and electrical uses. (The Carpenter Steel Co.)

For free copy circle No. 5 on postcard, p. 109

Temperature Control

A data sheet details a proportioning temperature controller. This instrument allows reliable, stable and accurate control over temperatures in industrial processes. (Electronic Process Corp. of California.)

For free copy circle No. 6 on postcard, p. 109

Pump

Literature now available tells of a new stainless steel pump. The 1-in. (suction) x ¾-in. (discharge) centrifugal pump handles chemical products. (Ampco Metal, Inc.)

For free copy circle No. 7 on postcard, p. 109

Pipe-thickness Gage

Pipewall thickness gages, using the Accuray principle, are outlined in an 8-page brochure. It tells how the very low radiation gage quickly, accurately measures pipe thickness. Highly portable (7¾ lb), it's easy

Quality in Ascendancy

The superiority of the vast number of products that are—and can be made from Roebling Cold Rolled Flat Spring Steel is a fact known throughout all industry.

You pay for mechanical and dimensional uniformity when you buy flat spring steel...you *get* it when you buy Roebling.

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Weldynamics

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How cost is reduced 37% ...weight cut 61% by Weldynamics

Here's how Weldynamics has solved the problem of rigidity, accuracy and cost for a machine builder. With welded steel design the weight was cut from 18,000 pounds to 7,000 pounds *while holding alignment accuracy to .003".* The cost was reduced from $2700 for a casting to $1700 for the weldment.

Weldynamics saves money because steel is 3 times as strong, 2½ times as rigid and costs a third as much per pound as cast iron.

How to put WELDYNAMICS to work for you

Lincoln field engineers, trained in Weldynamics, will help you design lower costs into your products. They stand ready to advise and recommend on procedures, equipment and electrodes to cut your welding costs.

New, 11th edition, "Procedure Handbook of Arc Welding Design and Practice" has 1300 pages, 1100 illustrations, 260 pages on machine design. $3.00 in U.S.A., $3.50 elsewhere.

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FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Steel Plates

Properties and capabilities of rolled steel floor plates are analyzed in a 4-page bulletin. Easily installed, these 11 and 16-gage 12-in. square plates are said to end floor replacements and provide safe, quiet and durable industrial flooring. (Wheeling Steel Corp.)

For free copy circle No. 21 on postcard

Stopper Heads

Care and use of stopper heads is discussed in a brochure. The first of a series, it also tells about new stopper head cartons and "palletized" containers in which one producer's stopper heads are now being shipped. (Joseph Dixon Crucible Co.)

For free copy circle No. 22 on postcard

Materials Handling

Featured in a 16-page publication are case histories of the successful application of mechanized materials handling techniques. (Lewis-Shepard Products, Inc.)

For free copy circle No. 23 on postcard

Steel Cylinders

New all-steel 2000-psi cylinders are described in an 8-page bulletin. These cylinders are used in fluid power applications. (The Oilgear Co.)

For free copy circle No. 24 on postcard

Bushings

A.S.A. and other standard drill jig bushings are listed in a catalog. Incorporating aircraft type bushings, it covers: a wide range on lengths and OD sizes in press-fit types; a new 5/32-in. OD group of press-fit bushings with holes as small as 0.0152-in. diam; a new ½-in. length added to the ⅞ and 1-in. OD groups of head and headless press-fit bushings. (Ex-Cell-O Corp.)

For free copy circle No. 25 on postcard

Refractories

Uses of one firm's high alumina products are covered in a bulletin. It describes standard brick, special shapes and ramming mixes. Detailed information is given on 70 pct alumina brick. (The Ironton Fire Brick Co.)

For free copy Circle No. 26 on postcard

Metal Finishing

A 24-page catalog deals with precision metal finishing by mechanical barrel-finishing methods. It tells how such techniques apply to grinding, deburring, descaling, polishing and coloring of metal parts. (Roto-Finish Co.)

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Vacuum Melt Furnace

A data sheet describes an induction heated vacuum melting furnace. The unit has a melt capacity of 50 lb. Extremely flexible, it's designed for development work or small quantity production runs. (F. J. Stokes Corp.)

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Micro Switches

Die-cast enclosed switches are briefly outlined in a data sheet, along with their advantages. It shows how these rugged little switches are easily wired. A new style housing gives them safety and insulator - sealing features. (Micro Switch Div., Minneapolis-Honeywell Regulator Co.)

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Fume Scrubbers

Clear pictures and detailed descriptions make a new bulletin on fume scrubbers both interesting and informative. The bulletin

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FREE LITERATURE

shows scrubbers used in metal treatment, electroplating, acid pickling, anodizing, and in laboratories. (Heil Process Equipment Corp.)

For free copy circle No. 30 on postcard

Minerals Industry

A new publication covers the field of Colorado's minerals. It deals with important minerals native to that state and their respective uses in industry. (For free copy, write on company letterhead to Publications Dept., Colorado School of Mines, Golden, Colo.)

Tempering Furnaces

Production tempering furnaces are described in a 2-page technical bulletin. It explains the equipment's "straight-through" feature, and also the availability of automatic loading equipment for "in-line" operation. (Ipsen Industries, Inc.)

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Gages

"Testing Circular Division with Precision Polygons" describes use of a precision reflecting polygon with a microptic autocollimator to check circular spacing accuracy of rotary tables, dividing heads and similar devices. (Engis Equipment Co.)

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Hydraulic Presses

A 12-page bulletin describes advantages of double and triple action hydraulic four-column metalworking presses. These presses perform versatile, low cost, deep metal drawing jobs. Presses range from 75 tons to 4000 tons. (Lake Erie Machinery Corp.)

For free copy circle No. 34 on postcard

Cutoff Wheels

"Which abrasive cutoff wheel is the right wheel?" asks a 30-page publication. Then, it goes on to explain how to get an answer. It's the newest in a series of booklets on abrasive cutting. Dealing with wheel selection, it lists advantages and limitations of this process. (For free copy write on company letterhead to Wallace Supplies Mfg. Co., 1300 Diversey Pky., Chicago 14, Ill.)

Valves

Incorporating detailed cross-sections, a 56-page catalog gives data on selection and application of valves. These leak-proof valves rate for oil and water pressures from 0 to 250 psi, 0 to 1500 psi, 0 to 3000 psi, 0 to 6000 psi, and 0 to 10,000 psi, and air pressures from 0 to 250 psi, 0 to 1000 psi, 0 to 2000 psi, to to 4000 psi, and 0 to 10,000 psi. (Barksdale Valves.)

For free copy circle No. 35 on postcard

Roller Chains

Complete pricing information on attachments for standard and double pitch roller chains is included in a bulletin. These attachments and some suggestions as to how they can be used are illustrated. (Diamond Chain Company, Inc.)

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Plastic Tanks

Polyethylene tanks described in a bulletin are self-supporting, lightweight, chemically inert and noncontaminating. The literature covers cylindrical tanks of 55-gal capacity; square tanks of 25-gal capacity; and 20 x 12 x 20-in. rectangular tanks. (American Agile Corp.)

For free copy circle No. 37 on postcard

Micro Switch

Covering a complete standard line of rotary selector switches, a 4-page bulletin includes information on new sealed subminiature assemblies. (Micro Switch Div., Minneapolis-Honeywell Regulator Co.)

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to use, nondestructive. Using just 0.2 mg radium sulfate rolled in gold foil and sealed in a stainless capsule, it's radiation safe. (Industrial Nucleonics Corp.)

For free copy circle No. 8 on postcard, p. 109

Micro Switch

Uses of miniature switches are presented in an 8-page publication. For design engineers and others, it contains several interesting items on switches which can have uses in metalworking. (Micro Switch Div., Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 9 on postcard, p. 109

Thermal Valves

Sliding-gate temperature control valves are described in a 6-page bulletin. (Jordan Industrial Sales Div., OPW Corp.)

For free copy circle No. 10 on postcard, p. 109

Motor Controls

Individual motor controls are discussed in an 8-page brochure. These run low-voltage motors up to 600-v, 1500-hp. (General Electric Co.)

For free copy circle No. 11 on postcard, p. 109

Saw Blades

Common sense tells you that using the right saw blade for the right job will give you best results. But who tells you which is the right saw blade? A new wall chart does! It lists various sawing factors affecting cutting rate, tool life, and finish. Proper tool velocities are given for cutting 48 metals. (The DoAll Co.)

For free copy circle No. 12 on postcard, p. 109

Tubular Products

Seamless mechanical tubing tolerances are contained on a data card. This card furnishes data from the new AISI Steel Products Manual. It details tolerances, both hot and cold, of round, seamless carbon and alloy steel mechanical tubing in various conditions of heat treatment. (Tubular Products Div., Babcock & Wilcox Co.)

For free copy circle No. 13 on postcard, p. 109

new

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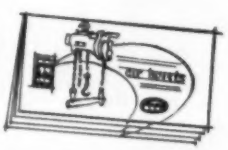

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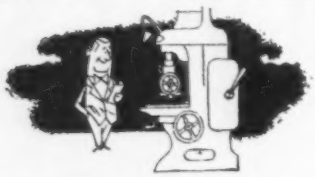

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OF TOOL ENGINEERS

Constant Inspection Assures Accuracy

Day-in, day-out checking of parts shows up in high quality end-products. Rejects are weeded out.

Constant inspection isn't easy on gages. Inaccurate gages let rejects get through.

Checking and double-checking gages is wise, too.

Tight production tolerances on machined parts demand efficient inspection methods. More than often end-product quality depends on adequate and proper use of gage blocks at the inspection station.

Take the Aircraft Div. of Holley Carburetor, for example. The division turns out jet engine controls and similar components within ±0.000050-in. tolerances. Keeping such accuracy requires highly effective production-rate inspection techniques. There's no room for production gages that leave room for error.

Gage Blocks Help—Accuracy of the aircraft firm's gages is regularly checked with gage blocks. Working closely with a supplier, Ellstrom Standards Div., Dearborn Gage Co., Dearborn, Mich., the company insists on a tight schedule for inspecting its more than 50 sets of gage blocks which are kept in constant use.

Serve In-Line Duty — In many cases the normal gage inspection cycle isn't sufficient to insure required accuracy. So the blocks are used on the production line as a double check.

Air gages of the vertical column type are calibrated at 5000 to 1 amplification. These are set with two gage blocks having a differential equal to the range on the air gage scale.

Because of their constant use, gage blocks are inspected at maximum intervals of six months (but many, more often). The gage firm carefully tests each block, certifying its accuracy within a millionth of an inch. Any blocks that exceed the specified limits are automatically replaced.

Inspectors check gages' accuracy with gage blocks.

Metallurgy

The Gordon Research Conferences on chemistry and physics of

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 109. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

metals for 1958 will be held from June 9 to August 29 at Colby Junior College, New London, N. H., and Kimball Union Academy, Meriden, N. H. The conferences are aimed at stimulating research in university and other laboratories. Scheduled lectures and free discussion groups will constitute the informal programs.

Additional data is available from W. George Parks, director of the chemistry department, University of Rhode Island, Kingston, R. I.

Warehousing

Controlled atmosphere keeps rust off steel stocks

Precisely controlled temperature and humidity are the successful weapons used against rust by a metal products firm.

A manufacturer of steel lockers, shelving and cabinets, Penco Metal Products Div., Alan Wood Steel Co., stocks its unpainted standard parts in dehumidified storage areas. Located at Oaks, Pa., the facility uses an extensive air-conditioning, dehumidification system which prevents rust from the components.

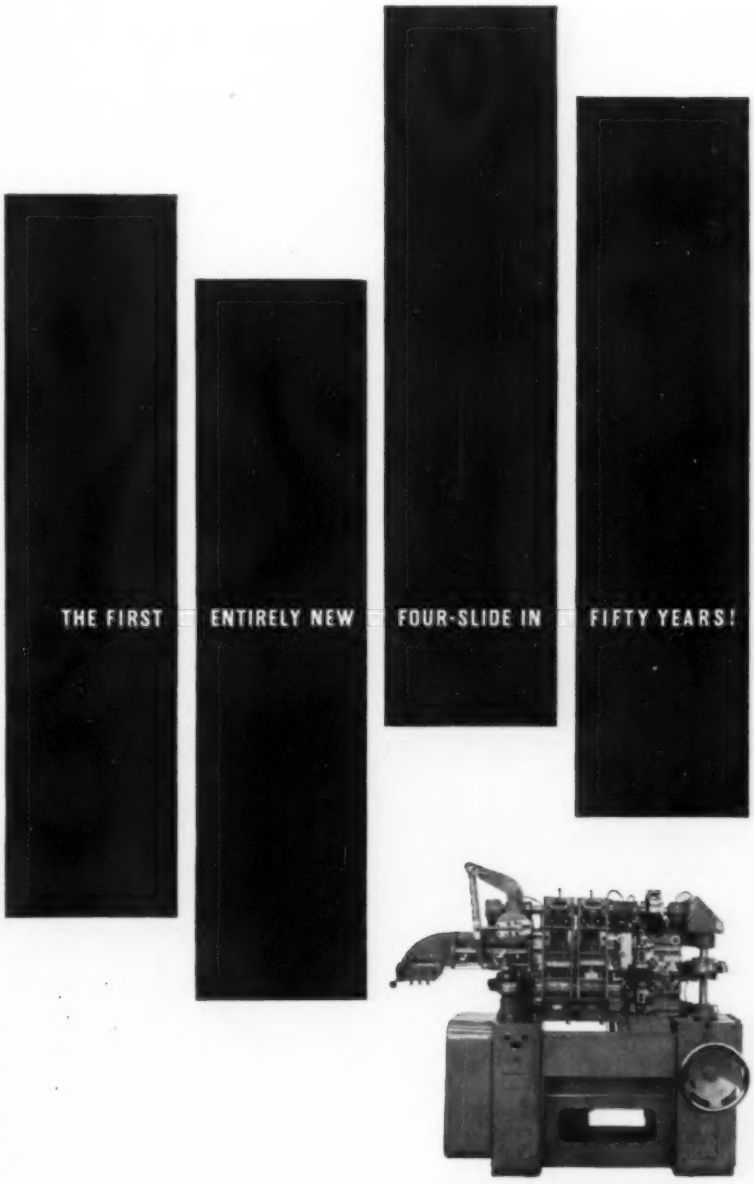
Foundry

Electrified paint reduces casting coating waste

Use of an electrified coating process lets a large foundry cut the cost of painting its castings for shipment.

At General Electric Co.'s Elmira (N. Y.) Foundry, castings hang on conveyor hooks that form a tight loop around an atomizing disk. The disk is charged with a high voltage and moves up and down on a reciprocating shaft. Paint flows onto the surface of the disk; this rotates at high speed.

Metal Attracts Paint—Centrifugal force carries the paint to the edge of the disk where it flies off in droplets. Each droplet carries an electrical charge picked up from the disk. The "electrified" paint seeks a metal surface on which to ground its charge.



A development of industry-wide importance is the Torrington Verti-Slide—a new vertical 4-slide that is the first major innovation in the basic field of wire and strip forming equipment in half a century!

The Verti-Slide was designed to meet a serious need for greater versatility, lower tooling cost, faster set-up time and reduced floor space. We urge you to investigate the new Torrington Verti-Slide in detail.

THE TORRINGTON MANUFACTURING COMPANY

TORRINGTON, CONNECTICUT • VAN NUYS, CALIFORNIA • OAKVILLE, ONTARIO

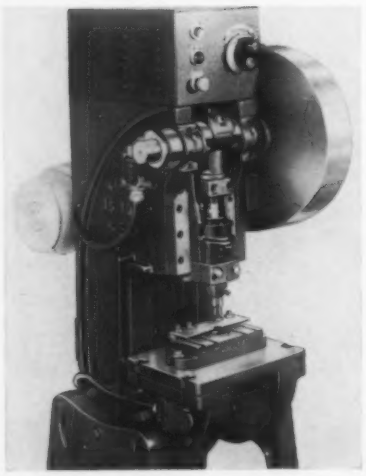
New Production Ideas

Equipment, Methods and Services

Hot Sizing Press Speeds Precision Forming

Handling titanium and high temperature steel parts for advanced aircraft and missiles, this hot sizing press speeds precision forming of such components. According to its maker, parts can be formed 13 times as fast and to infinitely more accurate tolerances with the hot sizing press than with some bench models formerly necessary. Further economies are credited to reduction of rejects and the press' ability to use relatively low cost dies. The press can produce 1-T radius parts in many titanium and tough steel alloys with hot sizing, thus reducing aircraft and missiles end-product weight. North American Aviation and McDonnel Aircraft Co. are receiving the first production models. North American developed the machine. (Sheridan-Gray, Inc.)

For more data circle No. 41 on postcard, p. 109



Automatic Punch Press Stresses Safety Items

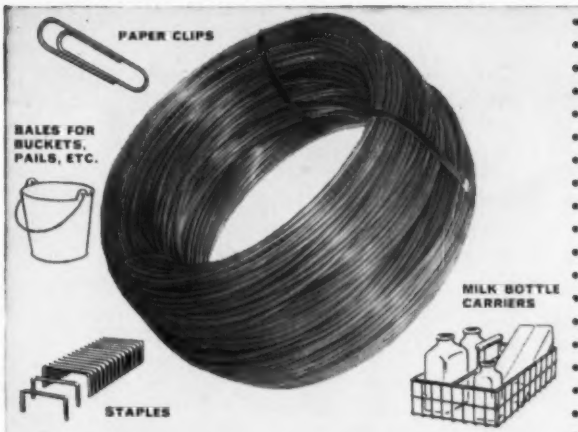
Safety is stressed by the builders of this punch press. The 15-ton press has no flywheel. Absence of the flywheel eliminates stored energy and double tripping hazards. The motor starts from a completely dead stop. It supplies power for the stroke without going through a mechanical clutching process. And it goes completely dead at the end of the stroke cycle. Double tripping is impossible. Dispensing with clutching also eliminates a great source of noise and vibration. To operate the press in a single-trip, the operator must depress two widely separated buttons simultaneously until the stroke reaches bottom. Thus he keeps both hands safely out of the danger area while the stroke is being made. To discourage any practice like fastening down one button into a permanently depressed position for one-hand operation, the press controls automatically refuse to work the unit. (Kenco Mfg. Co.)

For more data circle No. 42 on postcard, p. 109

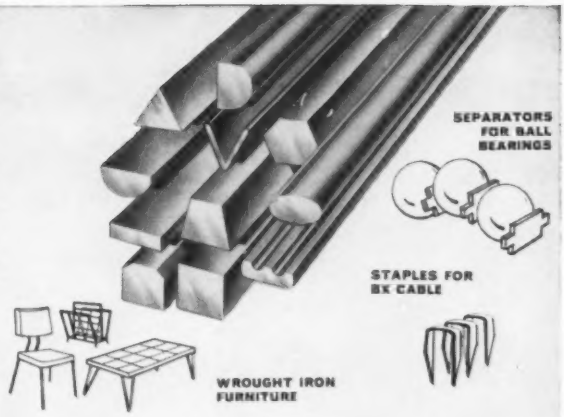
Lance Cuts Metal Materials of Any Thickness

Capable of cutting through metal or concrete of any thickness, this lance bites through such materials with comparative ease. Materials that were previously difficult or impossible to pierce by other methods can now be pierced and cut quickly by powder-lancing. Accurate control of intense heat is the key to operating the new powder lance. Lengths of standard black iron pipe are fitted into the front end of the unit, which is connected to an oxygen supply and a source of special metallic powder. The oxygen and metallic powder are mixed in the pipe and carried to the material being pierced or cut by the consumable pipe. This mixture is ignited at the end of the iron pipe. (Linde Co.)

For more data circle No. 43 on postcard, p. 109



ROUND WIRE—Sizes and finishes to meet almost any specification—$\frac{1}{4}$" on down, in coppered, tinned, bright, galvanized, and other finishes. Made with exactness and uniformity to insure excellent forming and workability. Mill catchweight coils up to 600# or single length Econo-Coils up to 3000# can be supplied, depending on quality, finish and gauge.



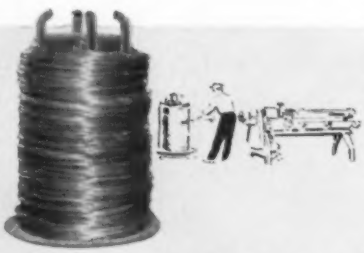
STANDARD AND SPECIAL SHAPES—Cut costs where it counts most—on forging, stamping, rolling and machining for moldings, product trim or other fabrication. Many shapes and sizes are available—V-shaped, oval, square, rectangular, keystone-shaped, and others. It will pay you to check their many cost-saving possibilities.

You can do it BETTER at LESS COST with...

CONTINENTAL® WIRE

In practically any size, finish, temper or analysis in low and medium low carbon steels

FINE AND SPECIALTY WIRE
Staple wire, tag wire, shoe wire, florists wire, pin wire, coil binding wire—an almost endless list of fine wire for special application. Many finishes, tempers and sizes.



ECONO-COIL Continuous length wire coils of 2000# to 3000# catchweight, in sizes from 12 gauge through ½" diameter. Reduces scrap loss up to 90 percent. Shipped on returnable Econo-Coil reels.

LEVERPAK—FOR FASTER, CLEANER WIRE HANDLING

Saves scrap, reduces down time. Protects wire from moisture, dirt, and the damage of ordinary handling. Permits long, uninterrupted runs of 500# to 650#. Easy to ship and store.

Send today for Data on Wire
Profit by our thousands of case histories that may point the way to significant savings for you... with Continental Wire.

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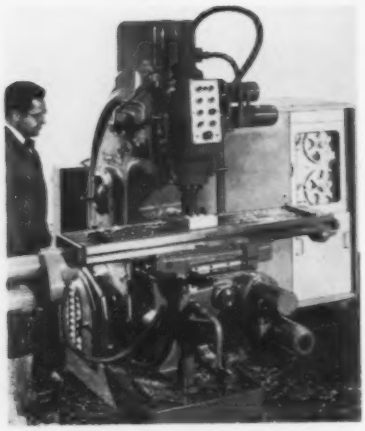
STEEL CORPORATION • KOKOMO, INDIANA

PRODUCERS OF: Manufacturer's Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright and special shaped wire. Also Welded Wire Reinforcing Fabric, Nails, Continental Chain Link Fence, and other products.

Metallic Honeycomb Bond Easily Checked

Nondestructive checking of the bond on metallic honeycomb (soldered, welded or brazed to the skin surface) is easily done with an inspection kit now available. Deformed core materials can be detected with the inner core pattern visible on the outer surface during the check. The part to be inspected is cleaned before spraying with a red test fluid. Controlled heat is applied by infrared light. Heat is carried from the skin surface to the honeycomb core wherever a good bond exists. The fluid flows to the coolest areas, and, accumulates at every point of good bond, showing an exact pattern on the bonded area. Defective bonded areas show as gaps in the pattern. Complex shapes can be tested. The kit comes in two cases, containing a powerstat to vary heat, the fluid and air hose with a pressure regulator and spray gun. (Magnaflux Corp.)

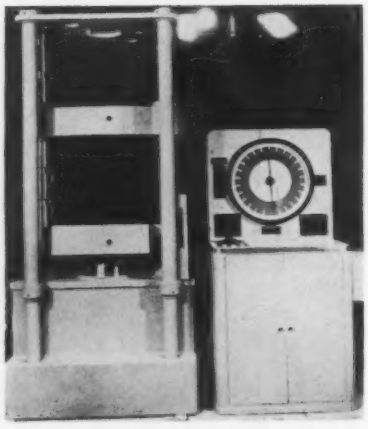
For more data circle No. 44 on postcard, p. 109



Milling Machine Has Numerical Controls

Small- and medium-size parts of ferrous and nonferrous metals are milled in three dimensions with this numerically controlled machine. Three standard knee type vertical millers are available in this line. These include: (1) a 5-hp machine with 16 spindle speeds ranging from 25 to 1500 rpm; (2) two heavy-duty 15-hp models; each has twin elevating screws and 24 spindle speeds. These speeds range from 15 to 1500 rpm. Power for short feed motions is transmitted through recirculating ball screws which assure efficiency, long life and accuracy for the units. Three control systems are available. These include Bendix, General Electric and ECS-Digimatic. Selection of the control system is based on the job involved and computer facilities available. Any one of the control systems can be applied to each of the three machine models. (Kearney & Trecker)

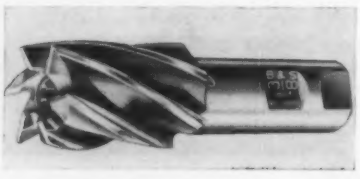
For more data circle No. 45 on postcard, p. 109



Testing Machine Uses Ball and Screw Design

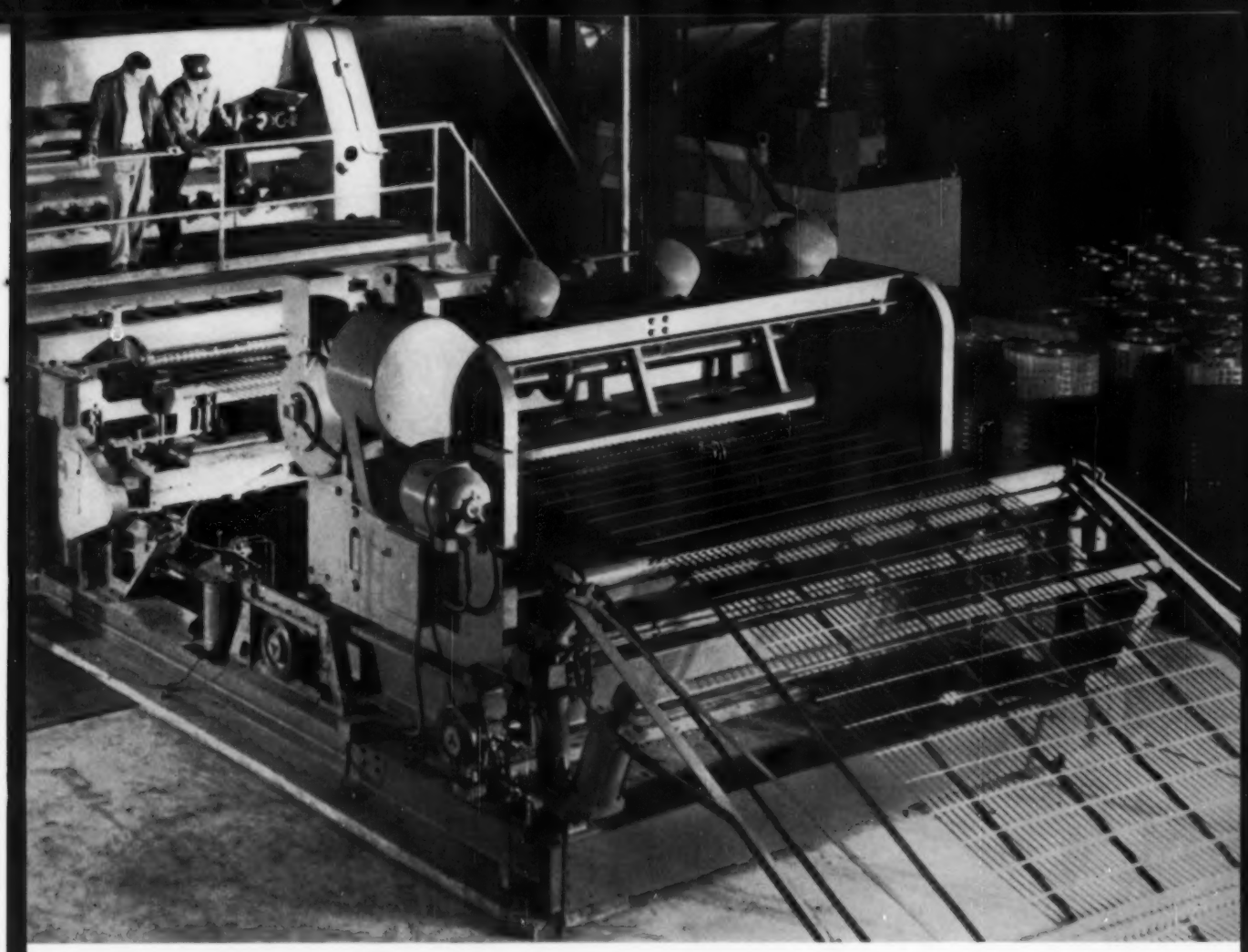
Capable of handling 150,000-lb loads, a universal testing machine uses a preloaded ball and screw mechanism on its single screw. This plus preloaded roller thrust bearings on the bull gear permit full capacity testing without backlash. The unit can test nearly every material or part subjected to sustained or alternating loads and strains. Loads are measured by load cells which transmit signals to the indicator. Key features of the unit include: positive head positioning, easily controlled constant or variable head speed, reversibility for tension or compression and ability to cycle both load and strain. Drive is by a 5-hp motor. Standard testing space is 30-in. wide with a 48-in. vertical opening. Two SR-4 universal type load cells measure load and transmit signals to a load indicator. (Baldwin - Lima - Hamilton Corp.)

For more data circle No. 46 on postcard, p. 109



End Mills Now Come in 79 New Sizes

Square-end end mills in 79 new sizes have been added to the more than 3200 "standard" milling cutters available from one manufacturer. Ranging in size from ¼ in. diam through 2 in., these end mills come in single-end, double-end, long single-end and extra long single-end.



Cincinnati Shear cuts wire mesh at Pittsburgh Steel

The Cincinnati Shear shown is part of an automatic wire welding machine at Pittsburgh Steel Company, Monessen, Pennsylvania. The machine produces wire mesh and fabric used for concrete pipe, buildings, and other applications. The photograph shows the shear cutting forty-seven 2/0 gauge (.331″) wires per stroke. The wire is low carbon, cold drawn steel. Other jobs require shearing mesh with wires up to ½″ diameter. This shear was specially engineered for this type of application. Because cuts are heavy and production is continuous, Cincinnati dependability is essential.

Standard Cincinnati Shears offer such productive features as powerful hydraulic hold-downs, all-steel interlocked construction, and one-clearance shearing of different metal thicknesses.

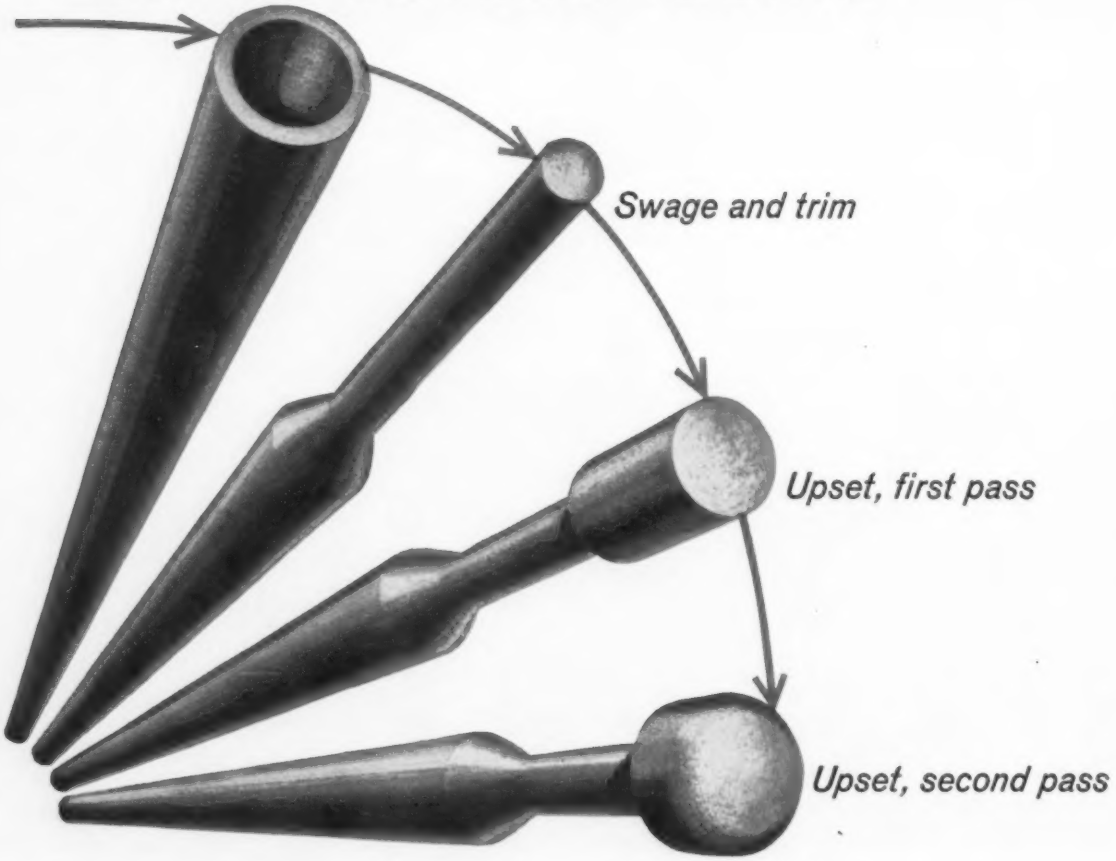
Write Department B for Shear Catalog S-7R.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio

Start with OSTUCO TUBING



and end up with a 34% *saving*

Here's a cost-cutting case history right in the Ohio Seamless mill. It proves we take our own medicine—*and like it.* You may, too.

Formerly, mandrels for rolling Ostuco Tubing on our Assel mill were made from two pieces. A shaped end, hogged out of solid bar stock, was welded to a long tube. Expensive to machine, weld and process.

We decided to *forge the mandrels entirely from Ostuco Seamless Steel Tubing.* In three steps—swage, upset and finish-form—we now produce better mandrels . . . ready for use without any machining whatsoever, *and save 34% over former processing methods.*

Chances are good that Ostuco Tubing is the right prescription for slashing your production costs, too. For expert advice, contact our nearest sales office or our plant at *Shelby, Ohio—Birthplace of the Seamless Steel Tube Industry in America.*

AA-7225

Visit us at Booth 771—Design Engineering Show Chicago—April 14-17

SALES OFFICES: Birmingham • Charlotte • Chicago (Oak Park) • Cleveland Dayton • Denver • Detroit (Ferndale) • Houston • Los Angeles (Lynwood) Moline • New York • North Kansas City • Philadelphia (Wynnewood) • Pittsburgh Richmond • Rochester • St. Louis • St. Paul • St. Petersburg • Salt Lake City Seattle • Tulsa • Wichita

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OSTUCO TUBING
1908 1958

OHIO SEAMLESS TUBE DIVISION

of Copperweld Steel Company • SHELBY, OHIO

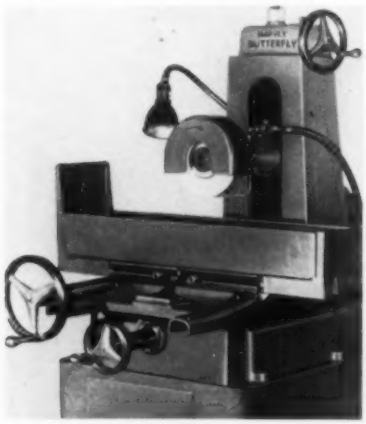
Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

The long and extra long types are designed for longer peripheral cutting with the maximum flute length 8 in. (Brown & Sharpe Mfg. Co.)

For more data circle No. 47 on postcard, p. 109

Surface Grinder

A new 8 x 12-in. precision hand feed surface grinder is sturdy, well constructed. Designed and built to handle large fine tolerance grinding as well as very small intricate work, it features a transverse slide which



travels on double-vee ways. It has a maximum capacity of 9 in. A specially constructed ½-hp motor drives the dynamically balanced spindle which was designed to assure true smooth running at high speeds. Permanently lubricated oversize super precision ball bearings are spring-loaded for take up on wear and heat expansion. Needle bearings are used throughout the machine. All ways are ground lapped and hand spotted. Maximum capacity of the grinder is 9 x 13 x 11½ in. (Harvey Mfg. Co.)

For more data circle No. 48 on postcard, p. 109

Radial Drill

Versatile and sensitive, a new radial drill features powered arm elevation. This is controlled by a single lever which locks the arm when the lever is in neutral position. A roller-mounted head on the arm is hand operated. One control starts, stops and reverses the spindle. While the machine is running on one operation, the operator can pre-set the speed for the next on the direct-reading dial. This feed dial can be turned to a new setting while the machine is running and the tool is engaged. With a 2-ft 6-in. arm length and 8-in. column, the unit has a drilling capacity in steel of 1 in.; in cast iron, 1⅜ in. (Maserati Corp. of America)

For more data circle No. 49 on postcard, p. 109

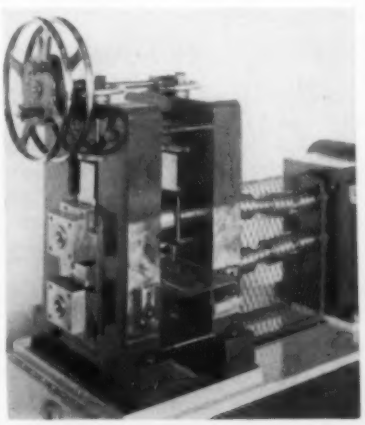
High-vacuum Valves

Gate type valves in a new series have a full-opening design allowing a straight-through unrestricted flow. A very short flow path provides high conductance. The high-vacuum valves may be installed in any position, and sealed vacuum tight against atmospheric pressure in either direction. A tight seal is maintained regardless of the length of time the valve has been in service. (Vacuum Equipment Div., F. J. Stokes Corp.)

For more data circle No. 50 on postcard, p. 109

Rolling Mill

This heavy duty, high precision, 2-high/4-high combination rolling mill can handle both metallurgical production and research work. It's equipped with mill housings, roll journals, universal spindles and a



drive transmission of extra large capacity. This heavy-duty design allows the mill to take reductions of more than 50 pct per pass while maintaining tolerances as close as 5 pct of thickness. Changeover from the 6 x 8-in. two-high to the 1½ & 6 x 8-in. four-high setup requires only 20 minutes. The two-high arrangement is used for either hot or cold breakdown rolling of plate and sheet. Grooved rolls are also available to process rounds, squares and other shapes. In the four-high setup strip is cold finish rolled to gauges as thin as 0.001 in. (Loma Machine Mfg. Co.)

For more data circle No. 51 on postcard, p. 109

Electroplater

Measuring just 34 x 28 x 33 in., a compact new unit contains all the equipment necessary for precision plating of small parts. It'll also do precious metals plating to specifications, or pilot plant work. Especially recommended for electrical or electronic parts plating, the unit permits either barrel or rack finishing with any cold alkaline solution, and most plating solutions, on a mass production basis. Completely automatic, all operations are controlled from a convenient panel board. (Sel-Rex Corp.)

For more data circle No. 52 on postcard, p. 109

WARD STEEL CO.

PROMPT WAREHOUSE SERVICE ONLY

Most Complete Stock in America of

BLUE TEMPERED SPRING STEEL

We believe that the way to sell is to carry a stock which permits satisfying any reasonable warehouse demand

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A Message to Executives Seeking a New Plant Site

Before You Decide . . .

Check These Three Plant Location Advantages

IN PENNSYLVANIA

100% FINANCING FOR YOUR NEW PLANT

Complete financing for Lease-Purchase of a new plant is available in labor-surplus areas of Pennsylvania. Interest as low as 2%, with deferred amortization, can be applied on up to one-half of total plant cost.

100% financing is also available in other areas of the state through special arrangement with community organizations, banks, insurance companies and other sources.

You select the community you want. You specify plant construction details or choose one of several plant "shells" now being readied for completion.

IMPROVED "TAX CLIMATE"

Pennsylvania recently took major steps to create a new "tax climate" favorable to new and established industries. The following basic tax changes were enacted in 1957:

Manufacturers were exempted from capital stock and franchise taxes;

Machinery and equipment taxes were eliminated, state-wide;

Tax on stock transfers was repealed;

Temporary 3% sales tax was made permanent;

Sales tax on purchases by manufacturing firms was reduced.

The absence of a state personal income tax, plus these new tax revisions, provide a major tax advantage to companies locating or expanding in Pennsylvania.

PLANT LOCATION SERVICES

The Pennsylvania Department of Commerce, through its staff of engineers and economists, will "custom-tailor" complete plans for a new plant site to your specific requirements. Special reports and tabulations will be presented covering labor, markets, transportation, communities, raw materials, minerals, water, power, fuel, engineering services, research laboratory facilities, etc.

Industrial representatives are also available to you for personal inspection tours and consultations concerning your plant location needs. *All inquiries are confidential!*

Investigate the potentials of a Pennsylvania plant location now! Write for:

- ★ Facts on "100% Financing For Your New Plant in Pennsylvania"
- ★ The Improved Pennsylvania "Tax Climate"
- ★ "Plant Location Services" brochure

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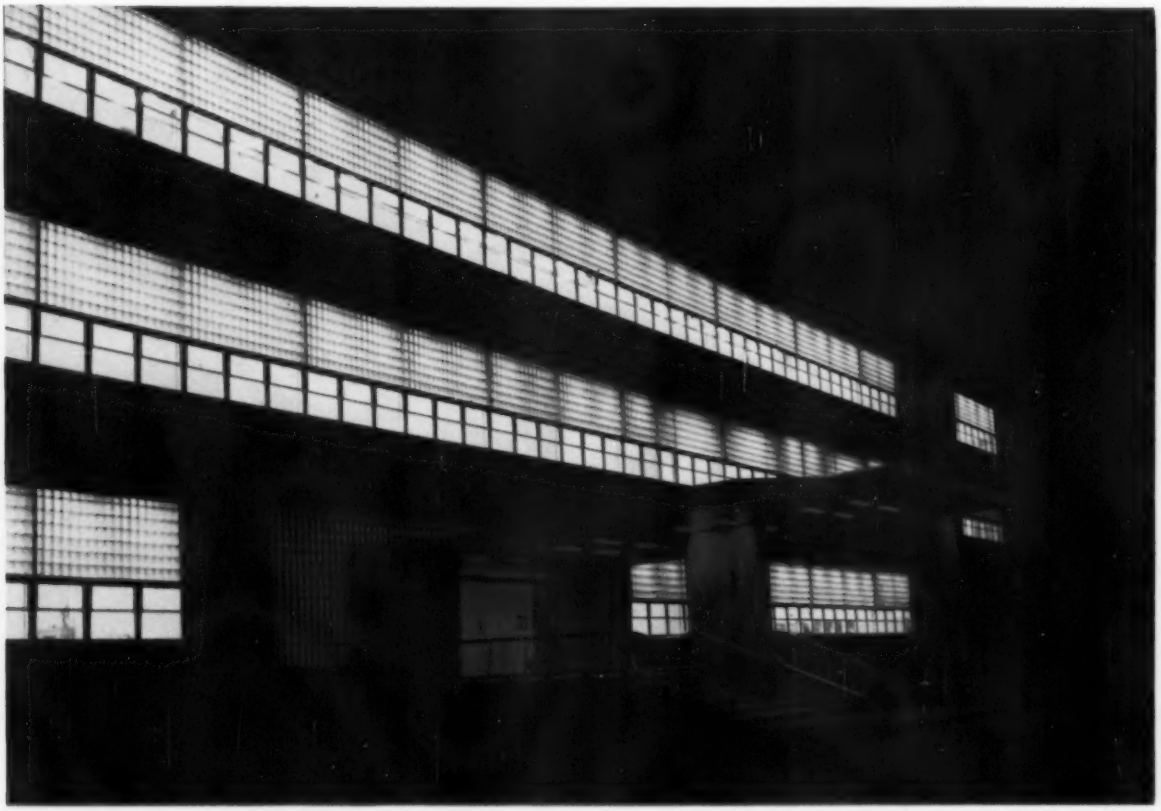


Fantus—located plant in New York State

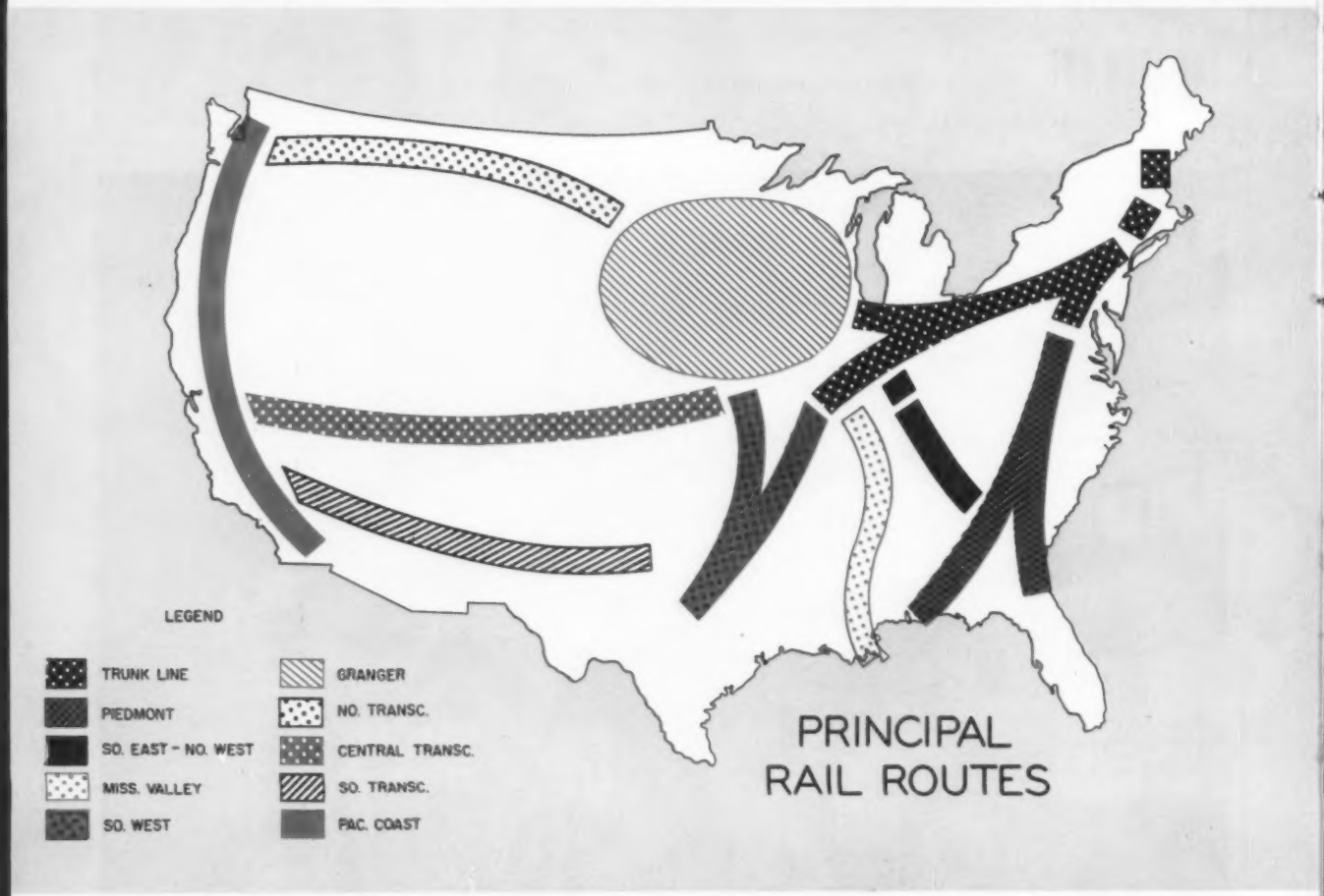
How to Choose a Plant Site

During the rush for expansion of capacity which characterized the metalworking industry from 1950-57, many mistakes were made in selecting plant sites. The current business slowdown is an ideal time to plan your next move carefully.

Fantus Factory Locating Service, a leading international authority in the science of plant location, has just completed a five-year survey of metalworking plants from a locational standpoint.

This article highlights findings of the survey, which included interviews with more than 2000 manufacturers of metal products. Candid statements by these companies provide positive proof of the need for careful planning and investigation at all stages of the location project.

Fantus records supply the basic material on labor considerations, tax trends, and industrial migration. Every producer of metal products should find this report useful in his own company planning. It points out the major trouble spots.



There Is More to a Good Site Than Geography

Geographic Location can be as important to a company as modern equipment.

But until costs are compared from region to region, no sound decision can be made. Guesswork is risky.

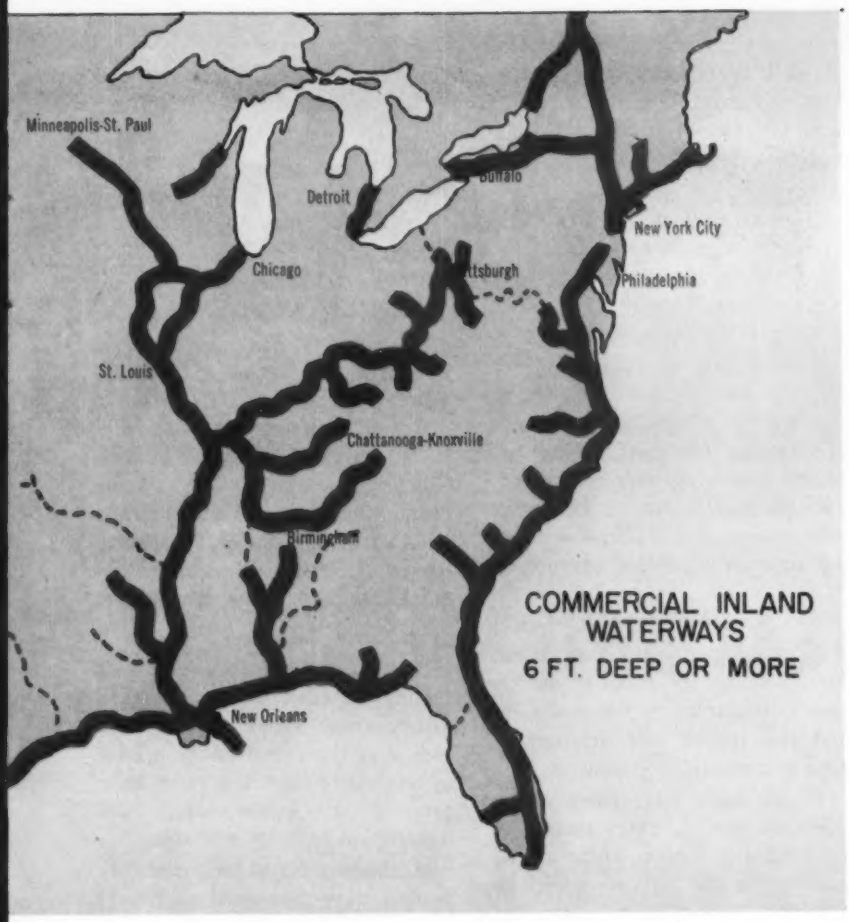
Firms who work out their locational programs in detail will be rewarded with important savings.—By Leonard C. Yaseen.

■ At every critical stage of growth, the manufacturer faces a location problem. The future success of his business may well depend upon the wisdom he uses in solving these problems.

Today, site selection by industry has been complicated by the shift in national population, decentralization of industrial markets, labor wage rate inflations, pyramiding freight rates, and higher taxes.

Survey Uncovers Errors—A survey of 2000 metalworking companies by Fantus Factory Locating Service turned up a surprising number of instances where companies had been disappointed in their choice of sites for new plants.

Observations of the mistakes made by other firms in the industry may help your management avoid the same pitfalls. The record now shows clearly that companies who worked out their locational program in detail have been able to achieve



important savings in production and distribution costs.

Set Your Goals — In location planning, a definite set of objectives must be established. It must be based on sound business principles.

Critical self-evaluation is essential and there is no room for preconceived notions. Until cost relationships are set for major regionally-variable factors, no opinion can be crystallized as to the general geographic area to be considered.

Compare Costs — To arrive at correct values, it is suggested that costs at the present location be tabulated to serve as a yardstick for judging prospective sites (see checklist).

Each of these cost factors are regionally variable. It's an inescapable fact that geographic location may be as important to metalworking plants as sound management, modern facilities, and astute merchandising policies.

Since the largest savings may be expected among major cost elements, this report will deal mainly with them. The elements include:

Inbound Raw Materials

In metalworking companies, there is a distinct tendency to overemphasize the importance of raw materials as a locational factor. The major concentrations of metalworking centers tend to coincide with the location of primary metals producers.

However, successful production of fabricated metal products is being accomplished at considerable distances from steel mills. This is a definite indication that immediate proximity to raw materials sources is unnecessary.

Examine Rates — The problem of access to raw materials must be carefully studied since insistence upon this point by a firm's purchasing department can prevent achievement of marketing, payroll, tax, or other cost-saving goals.

It must be recognized that raw materials used in metalworking plants are subject to complex pricing patterns and special freight rate structures. Nonferrous materials are usually sold on a "delivered" basis. But movements of steel reflect a combination of F.O.B. mill pricing and extensive freight rate equalization among competitive mills.

Distance No Criterion—Most of the raw materials used in metalworking have been accorded rela-

Leonard C. Yaseen is senior partner, Fantus Factory Locating Service of New York and Chicago.

He has been plant location consultant to more than 1400 companies making products ranging from aircraft to collapsible tubes.

While charting the decentralization of some of the nation's most important industries, he has accumulated a tremendous fund of data on virtually every industrial community in the U. S.

Plant Location Checklist

Transportation Costs

- Inbound materials
- Outbound products

Labor Costs

- Direct production
- Nonproductive
- Fringe benefits

Plant Overhead

- Rent or carrying charges
- Real estate taxes
- Personal property tax
- Fuel for heating
- Additional costs due to inefficient layout, lack of siding, etc.

Utilities

- Power
- Gas
- Water
- Other fuels for process

Taxes and Insurance

- State taxes
- Local taxes
- Workmen's compensation

tively low freight rate levels under the various "commodity" rate structures and special exceptions. These are designed to reflect the delicate balance between competitive sources. The rate structure places less emphasis upon distance than upon ability of the supplier to reach a given market.

Such commodity rates are dynamic and can be readily established to meet shipper and carrier needs at new manufacturing locations. A sympathetic reception by the carriers to reasonable rate proposals can be anticipated.

Flexibility — Before reaching a decision that the metalworking plant must be situated close to a source of steel or other basic materials, it is advisable to examine total raw material assembly costs and relate these to all other variable cost factors.

When considered in this light, freight costs on raw material movements may be revealed as relatively flexible—provided any penalties are offset by other long-term economies.

In the Fantus survey, some metalworking firms reported that their new location offered the advantage of relatively low raw material assembly costs. Yet their competitors who were more remote from mill sources were able to offer low prices due to other locational advantages.

Markets

At the outset, a decision should be reached on the extent of market area to be served by the new plant and the freight rate relationship among competitive producers.

If consistent with other objectives, the new facilities should be established at a point where a definite freight rate advantage can be achieved. It will assure control of a substantial market and maintenance of a good competitive position to important adjoining market areas.

Hindsight—In the survey, over 40 pct of the manufacturers indicated that regional plant sites were chosen in order to offer lower freight rates and insure better service to customers. Almost a third of this number admitted serious mistakes in judgment and knowledge of transportation geography.

No less than 17 companies had built warehouses and found that the available freight "spread" was insufficient to warrant the capital outlay involved.

Law Suits Follow—Three companies were involved in expensive legal battles before the Interstate Commerce Commission in attempts to secure freight transportation services which they had assumed to be available. (Note: The use of a highway in front of the plant by over-the-road trucking firms most assuredly does not guarantee service.)

One large metalworking company was somewhat chagrined to report that it had located outside the free pickup and delivery zone of a large city. The oversight is probably costing the company in the neighborhood of $40,000 annually.

Finding the Center—Calculation of the center of markets may prove helpful for those seeking to obtain lowest total outbound freight costs and minimum time-in-transit to all customers. In that event, location should be selected at or near the center of markets but caution should be used in applying this statistical device. For, like other techniques employing averages, it can only be used as a guide.

You'll Need a Map — To start finding the center of your market, a large map should be prepared indicating the extent of the market to be served by the new plant, location of competitors, and local distribution facilities available.

Accurate comparisons can only be made if present outbound freight costs are known. Cost data should be prepared showing the shipping weight to each destination and the percentage of this weight handled by various types of carriers.

Simplifying the Job — Where LTL distribution is used, knowledge of the weight normally shipped at one time will be necessary in finding applicable rates.

Unless a very small market area is being considered, it will be advisable to reduce the number of individual rate calculations from the present plant and proposed locations. This can be done by grouping destinations into retail trading areas.

The Comparison — The map should be overlayed with graph paper. The number of distance units along the X axis and Y axis of each destination are found, entered in a table, and compared.

As stated earlier, this method should be regarded only as a guide.

Labor: The Most Complex Problem

Mistakes most often made involve faulty judgment of labor supply and costs.

In some areas, a large pool of skilled labor doesn't guarantee high worker output.

Then there are labor turnover patterns, absenteeism, and attitudes to consider.

▪ Interpretation of labor market patterns is one of the most complex parts of a location assignment. Among the errors cited by metalworking companies, labor was mentioned most frequently.

Some firms, for example, had based their decisions on average hourly rates rather than on job-for-job comparisons. Others apparently had neglected to take into full consideration piecework incentives, overtime earnings, cost-of-living adjustments, or profit-sharing programs.

Wage Contradiction—A number of companies admitted that they had omitted traditional low-wage-rate areas from consideration because they believed that the differentials were temporary. They also assumed that considerable difficulty would be encountered in finding skilled personnel.

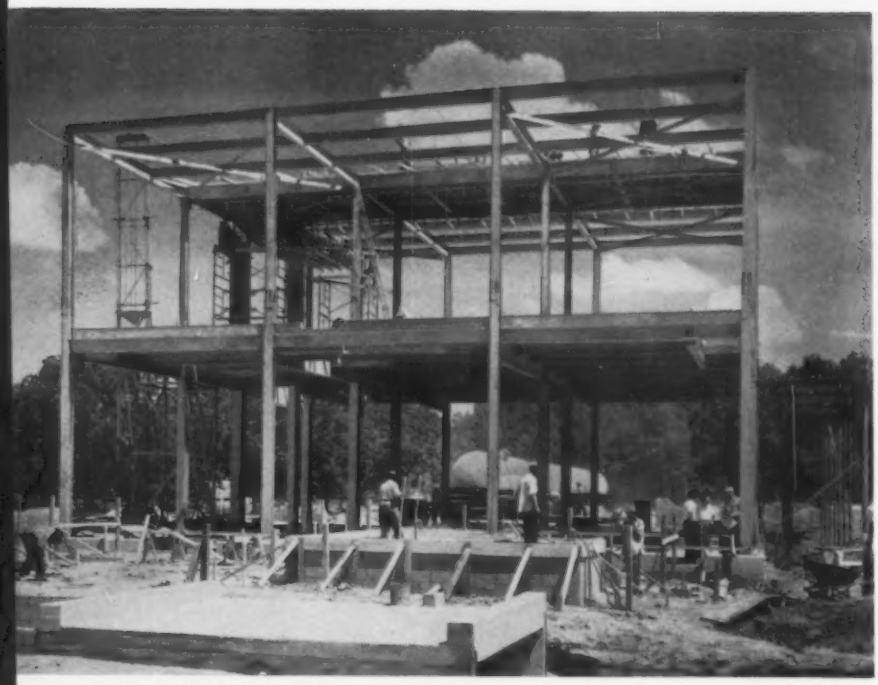
Some of these same firms admit, however, that competitors in low-wage-rate areas have consistently maintained their favorable wage position and are turning out excellent products.

The existence of regional-wage differentials is well documented. Further, it is quite evident that these state-wide differentials are as wide or wider than ever before.

Keep Looking — Those metalworking firms requiring a high proportion of skilled workers will not

Wage Costs Can Make a Difference

Typical High Earnings States	Average Hourly Earnings 1952	1957	Increase in cents per hour
Michigan	$1.98	$2.51	$.53
Ohio	1.83	2.36	.53
California	1.87	2.32	.45
Typical Low Earnings States			
Mississippi	1.09	1.41	.32
Arkansas	1.14	1.46	.32
North Carolina	1.20	1.42	.22



BEST SPOT: Low building costs were one of the many factors considered by Merck & Co. before deciding to build its new plant near Albany, Ga.

be able to take advantage of the differentials available in under-industrialized states.

However, they should not conclude that intra-regional payroll savings are unavailable. The search for a suitable community will be more difficult but accomplishments, as measured by labor cost savings and increased productivity, may be most rewarding.

Wage Gaps Narrower — The greater percentage increase for unskilled jobs during the early postwar period came about largely because cents-per-hour increases were applied uniformly over the entire range of job classifications.

These rate adjustments had the effect of reducing the differential between the average pay of tool and die makers from 63 pct in 1945 to 39 pct by 1953. For production machinists the reduction was from 51 pct to 30 pct during the same period.

Small Town Attraction — This compression of pay differentials has definitely reduced the incentive for employees to increase their degree of skill and responsibility. As a result, productivity falls short of expectations despite high average earnings in traditional metalworking centers.

Smaller communities in the same region may offer only slightly lower wage patterns for skilled workers, But the linear pattern of the wage structure in these communities increases the differential between labor grades and enhances the attractiveness of advancement. As a result, productivity of individual workers is high and there is intense competition for promotion.

Get Facts First Hand—Inadequate labor supply was mentioned by many companies as a locational problem. Upon further questioning they admitted regional dependence upon statements of local promotional officials or general estimates supplied by state employment agencies.

In some instances, assumptions that skilled workers could be recruited from the group of workers commuting to highly paid jobs outside the city proved untrue. In other instances, the selectivity ratio was considerably lower than originally anticipated due to the large percentage of average applicants, marginal workers, or the physically unfit.

Size Up the Unions — Costly strikes in the new location were reported by a sizable number of metalworking firms. Apparently, the strength of unions was underestimated. Without basis, executives assumed that movement to another state or region would automatically avoid labor disturbances.

In these cases, executives apparently neglected to thoroughly investigate labor turnover patterns, absenteeism, and work attitudes as reflected in mandays lost in previous local strikes and labor disturbances.

Fringe Benefits

Under the present advanced status of fringe benefit provisions in union contracts, it is inexcusable for plant site investigators to overlook comparisons on number of paid holidays, vacation programs, hospitalization, medical and surgical coverage, life insurance, etc.

These indirect payroll costs vary considerably from community to community and represent a major locational factor.

Contracts Also Change—Further, it should not be assumed that adoption of the company's present contract terms in the new location will be satisfactory. Several companies reveal that they had been unexpectedly faced with the need to adopt some form of guaranteed annual wage at branch plants in order to match local patterns.

Others who had considered cost-of-living adjustments as a fringe benefit found that wage patterns were unduly inflated by this method in the new community.

Plant Overhead

Construction costs fluctuate widely from region to region. In the

Great Lakes area, for example, a building for metalworking operations costs approximately $15 per sq ft. The same structure can be built in under-industrialized areas of the South for about $7 per sq ft. Provisions for air conditioning may raise the price to $9.

It is not assumed that real estate tax levies will directly reflect differences in construction costs. When assessment ratios and local rates are fully evaluated, rather surprising differences in annual tax bills appear. Variations in personal property taxes tend to further augment these differences.

Other Costs Add Up — Within this category of costs, however, the greatest savings usually available involve the additional costs encountered in the present plant due to inefficient layout, lack of a siding, waiting time at elevators, additional material handling, etc.

As a rule of thumb, a typical multi-story operation can be conducted in about 20 pct less floor space when transferred to a modern single-story structure. Savings in labor costs for a typical company employing 500 workers might be reduced by as much as $100,000 by moving the operation from obsolete facilities.

Utilities

Utility costs usually represent a minor factor for metalworking firms. However, the cumulative savings which can be had through lower power rates and availability of natural gas at reasonable cost should not be overlooked.

Taxes and Insurance

An increasing burden is being placed upon the states for the support of schools, institutions, road construction and welfare. As a result, state taxes have gone up 144 pct since 1946. States are constantly seeking new methods of raising revenue. Long-term debt of the states, despite these tax boosts, have multiplied from $2.8 billion to $13 billion in 10 years.

While the entire burden of taxes

When Selecting a Location:

DO

—Know your present cost structure in terms of geographically variable factors.

—Examine the problem and set out your objectives clearly.

—Recheck data supplied by agencies who must necessarily "sell" the area they serve.

—Determine availability and comparative delivered price of necessary raw materials.

—Plot out freight rates from the selected community and competitive producing points and check the quality of transportation service to the market area.

—Assess the labor market carefully, including comparative wage rates, fringe benefits, availability of applicants, productivity, stability, and living costs.

—Examine state and local tax structures critically, placing emphasis on the philosophy of industrial taxation and extent of long-term indebtedness.

—Compare utility rates and reliability of service.

—Determine the available sites, land acquisition prices, applicable zoning, and building costs.

—Look for positive indications of the community's desire for new industry and living conditions acceptable to transferees.

DON'T

—Don't permit preconceived notions to interfere with objective analysis of your problem.

—Avoid premature announcement of your intentions, which may lead to labor or competitive repercussions.

—Don't be swayed by the arguments of your suppliers, customers, or others not intimately acquainted with your particular set of problems.

—Don't launch field investigations prematurely.

—Never assume that your plant must be adjacent to sources of raw materials.

—Don't overlook blind spots in the transportation services available in specific communities.

—Never overestimate the ability of a community to supply labor regardless of its population.

—Don't overlook investigation of water pressure at the site or the ability of the municipal system to handle plating, pickling, and other plant wastes.

—Don't purchase a site until all details have been worked out and test borings have been taken—instead take an option on the property.

—Never establish a facility in a community torn by internal dissention, labor strife, or evidence of violence.

—Federal, state, and local—must be lumped together in reaching location decisions, it is not unusual to find that there are substantial differences among the states which can influence the selection of alternative locations when all other costs are known.

Don't Neglect Insurance—Among the most important items is workmen's compensation insurance. Yet it is frequently overlooked. Premium rates vary widely from state to state for identical job manufacturing code numbers.

Since the premiums are based on every $100 of payroll, these variations must be viewed cautiously. Conclusions should not be drawn until wage rate variations have also been calculated.

Climate

Each area of the U. S. has a characteristic climate. If certain industrial processes require minimal seasonal differences, the manufacturer would do well to examine Southern California.

No other section of the country offers so slight a difference between winter and summer temperatures. On the other hand, the Pacific Coast region experiences the greatest degree of fog in the U. S.

It is a proven fact that weather exerts great influence on human efficiency and behavior. The desire to work and capacity to produce are affected by the weather.

Snow, rain, glaze and sunshine, all have an effect on both employer and employee, on total costs of doing business, and even the type of structure needed to house an industrial operation.

Even future marketing policies are dictated by climatic factors.

How Some Companies Did It

Lower Labor Costs

▪ A manufacturer of metal packaging containers was "guaranteed" a substantial account — provided he was willing to establish a branch plant convenient to that customer's production facilities. Vacant land was available adjacent to the larger firm's plant and the supplier was urged to erect a structure here.

Further study revealed, however, that entry wage rate for laborers under the customer's union contract exceeded average rates for production workers in the main plant of the container manufacturer. It would be impossible for the supplier to offer his product at a competitive price and pay wage rates established in that local labor market.

The Answer—A Fantus survey showed that the container producer could establish his branch plant about 60 miles from the major customer's facilities and insure prompt delivery of the product using a company truck. The recommended location offered a substantial savings in wage rates—considerably lower than those offered in the main plant, and simultaneously improved the company's marketing position in the entire region.

Market Proximity

▪ A major manufacturer of business equipment had been establishing all of its new expansion within the same general area, based on the argument that costs of supervision would be reduced in this manner.

Analysis revealed that the initial plant had been poorly oriented to national markets for the product and that subsequent expansions in the vicinity were compounding the distribution problem.

A market survey, with projections to 1975, clearly indicated need for an establishment of the next branch plant closer to the center of markets and almost 900 miles from the cluster of present plants.

Extra Dividends—A shift in production to the new location resulted in savings of 15 pct on total outbound shipments and considerably more flexibility in labor supply.

Executives who had been concerned about supervision were surprised to find the plant virtually self-sustaining. They also found that necessary inspection trips could be accomplished with minimum difficulty using direct airline service

Freight Savings

▪ One manufacturer of screw machine products has definitely proven that a high quality product can be manufactured at lower cost at a location outside the traditional metalworking centers.

Within a period of ten years, this new company has become a dominant competitor in its industry, with productivity at least 50 pct higher than comparable plants at a wage differential $.50 an hour lower.

Beats Competitors—It has been possible for the company to overcome its penalty on inbound wire by operating its own truck for these supplies which in turn makes deliveries of finished products in the mill area. The firm dominates an important regional market as well, almost to the exclusion of all other producers.

Maps on pages 122 and 123 are from Mr. L. C. Yaseen's book, "Plant Location," copyright 1956, by American Research Council.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

N&W research has proved the locations of multi-million ton 97.8% pure limestone deposits

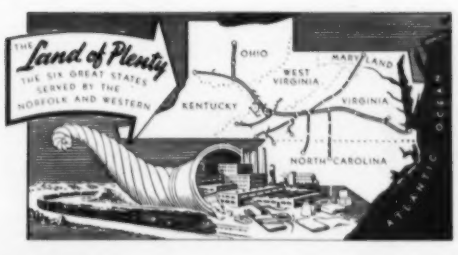
To a trained geologist, outcroppings such as these mean abundant limestone, but the scope and depth of the beds can be determined only through test drillings.

Norfolk and Western plant location specialists and consulting geologists have found in *The Land of Plenty* a vast source of top-grade limestone. One location alone is estimated to contain more than 100 million tons!

The beds range in thickness up to 100 feet, and the percentage of purity is almost 100%. Moreover, this limestone is easily accessible . . . which means increased operating economy for manufacturers needing high quality calcium or dolomitic limestone.

These statements are backed up by facts obtained through extensive research in the field and the laboratory. All findings have been confirmed and are open to your inspection.

Our plant location specialists will be glad to provide detailed information . . . in confidence and without obligation. Let them give you the facts on limestone and other advantages of *The Land of Plenty.*



The thoroughness of N&W research is depicted by this photo. Extensive drillings were made, and cores were sent to an independent geologic laboratory for scientific testing.

And here are typical analyses*

	DHL-1-1	DHL-1-2	DHL-1-3
SILICA ($Si O_2$)	36%	.30%	.34%
IRON OXIDE ($Fe_2 O_3$)	.072	.043	.049
ALUMINA ($Al_2 O_3$)	.21	.20	.19
LIME (CaO)	55.00	54.90	55.40
MAGNESIA (MgO)	.65	.62	.51
SULPHUR (S)	.012	.011	.015
PHOSPHORUS (P)	.006	.006	.009
IGNITION LOSS	43.20	43.50	43.20
CALCIUM CARBONATE (Calculated)	97.90	97.72	98.51
MAGNESIUM CARBONATE (Calculated)	1.36	1.30	1.07

***Report prepared by Pittsburgh Testing Laboratories, Pittsburgh, Pa.**

The minimum of dark spots in this typical test core indicates premium limestone — ideal for chemical lime, calcium carbide and other important processed materials.

Write, wire or call—

L. E. Ward, Jr., Manager
Industrial and Agricultural Dept.
Drawer IA-795 (Phone Diamond 4-1451, Ext. 474)
Norfolk and Western Railway
Roanoke, Virginia

Norfolk and Western RAILWAY

METALWORKING AND MACHINERY MANUFACTURERS

improve service and cut costs with an Iowa location

according to an independent research firm*

- HARDWARE MANUFACTURE
- SCREW MACHINE PRODUCTS
- MECHANICAL MEASURING AND SCIENTIFIC INSTRUMENTS
- GRAY IRON AND NON-FERROUS CASTINGS
  Die Castings and Powder Metallurgy
- GAS-FIRED WATER HEATERS
- REFRIGERATION MACHINERY
  Compressor and Condenser Units
- QUALITY LABOR AT COMPETITIVE PRICES

How these industries were selected

The Metalworking and Machinery industries were found to have outstanding profit possibilities with an Iowa location. Analysis of the following factors supports this conclusion: proximity to markets, raw materials and supplies; operating costs, wage and freight rates; quality, aptitude and supply of labor; transportation and utilities; taxes and government attitudes.

The Iowa Development Commission has compiled a concise survey of statistics and research findings to assist potential industries in evaluating their profit possibilities in Iowa. This current information is now available to industrial executives considering new plant locations now or in the future.

*Fantus Area Research, Inc.

Product Transportation Savings — Iowa and the six states surrounding account for more than 21.3% of lumber-building hardware retail sales in the U.S. A Northeast coast manufacturer could save $70,000 a year on shipments of five million pounds from a branch plant in Iowa.

Improved Competitive Position — Hardware sales total 9.5% of retail sales in this area. The national average is 7.5%. A plant in Iowa can reach major hardware buying centers in Omaha, Minneapolis-St. Paul, Chicago, Indianapolis, St. Louis and Kansas City by overnight truck service.

More Favorable Wage Patterns—Quality labor is available in Iowa at more economical hourly rates for press, machine, bench, buffing, polishing, inspection and packing work.

High Sales Potential — The North Central states adjacent to Iowa contain a heavy concentration of industry requiring wood screws and other screw machine products — from 21% to 51% of total U.S. production.

Fewer Competitive Pressures — There is an undercapacity of screw machine products manufacture in Iowa.

Economical Wage Rates — A comparison of hourly wage rates between a Northeast location and an Iowa location averages more than 40c less per hour in Iowa. A wood screw and screw machine products plant employing 300 workers would realize an annual payroll savings of $265,636.

Closer to Center of National Market — The centers of many markets for these products — such as the manufacturing of heating, electronics and aviation equipment, household appliances and others — are located in Iowa and her neighboring states.

Surplus of Labor—Important Wage Savings — It is estimated that 60,000 females readily trainable in factory techniques, could be encouraged to enter Iowa's labor force if job opportunities were available.

A typical instrument manufacturing plant of 400 workers in Iowa would realize an annual payroll savings of almost $150,000 over a Northeast U.S. location.

Excellent Iowa Market — Employment of industries requiring gray iron and non-ferrous castings and powder metallurgy parts in Iowa shows a steady upward trend from about 55,000 in 1947 to more than 75,000 in 1953.

Most castings and virtually all powder metallurgy parts must be purchased outside the state. A plant producing these castings and parts in Iowa would serve a strong and growing market.

Availability of Seasonal Labor — Large die casters frequently expand their work force in the peak production winter months. Many of Iowa's farm workers, high in mechanical aptitude, are available during this season.

A Major Regional Sales Territory — An Iowa location offers access to a fourteen-state market accounting for almost 30% of total U.S. market for gas-fired water heaters.

Low Payroll Costs — An eastern manufacturer employing 150 workers would save a minimum of $106,080 per year with an Iowa location.

Significant Freight Cost Savings — This same eastern manufacturer could save $88,422 a year on out-bound freight costs from an Iowa location.

Surrounded by Thriving Markets — In 1954, 48% of the refrigeration machinery industry was located in four states directly east of Iowa. Other users of compressors and condensers are beginning to concentrate in areas north and south of Iowa.

The industry volume in states west of the Mississippi and east of the Rockies is growing at a rapid rate.

In addition to the excellent markets in all four directions from Iowa, the state itself represents good sales potential.

Adjacent to Parts and Supply Sources — Iowa is a leading state in foundry activity — 177,000 tons of gray iron castings in 1954. The state has primary firms producing forgings, aluminum sheet and plate, tubing, stamping, heat treating, plating, die casting and screw machine products. Electric motors are supplied from nearby areas.

An advantage to all new industry in Iowa is her exceptionally stable, well educated labor force. Over 38% of all Iowans are high school graduates. And Iowa's unemployment compensation rate is the 5th lowest in the nation (0.8% in 1955) — a good indicator of labor's stability in Iowa.

A comparison of gross hourly wages paid in metalworking and machinery products industries shows an important differential favorable to Iowa.

NEW...IOWA INDUSTRIAL RESOURCES FACT BOOK

AVAILABLE NOW — The new Iowa Industrial Resources Fact Book gives you a review of facts pertinent to industrial location. It is available without charge upon request. Address your request to:

IOWA DEVELOPMENT COMMISSION
389 Jewett Building
Des Moines 9, Iowa

100% FINANCING

for your new plant

...and at low, low interest rates!

Communities in our service area are prepared to roll out the red carpet for desirable industry to the extent of *totally financing* construction of the plant.

It's a unique plan for lease/purchasing that combines funds from non-profit community development corporations and the Pennsylvania Industrial Development Authority with first mortgages through private lending institutions.

West Penn Power is prepared to obtain information for you, in strict anonymity, about communities participating in this plan and, in addition, provide specific information on many other plant location factors to assist in your evaluation of WESTern PENNsylvania as a desirable location.

W E S T P E N N P O W E R

an operating unit of the WEST PENN ELECTRIC SYSTEM

Hello...

I'm Charlie Fife . . . of course every plant must have 100% financing of some kind; but, I'm sure you'll agree that this unique plan can solve a lot of problems, providing others, equally important, can be worked out as well.

Labor supply, for example. We have communities with excellent labor pools, both male and female, on which new industry can draw. But are the needed skills available at the right wage scale? Facts, figures and skill surveys from our files can tell you.

Because these problems are complex, West Penn Power maintains a staff of plant location specialists to assist in your evaluations. There is no charge for this professional service, of course . . . and you may be sure your confidence will be respected. Write today.

CHARLES M. FIFE, *Manager*
Area Development Department

WESTern PENNsylvania

WEST PENN POWER, Area Development Department, Cabin Hill, Greensburg, Pennsylvania IA

Yes, I'm interested in WESTern PENNsylvania:

☐ Please contact me in strict confidence. ☐ Please send booklet, "Plant Location Services."

Name_____ Title_____

Company_____ Street_____

City_____ Zone_____ State_____

U.S. Offers Plant Location Help

Information Center Set Up in Commerce Dept.

By Victor Roterus—Director, Office of Area Development, U. S. Dept. of Commerce.

Companies looking for a plant site can get information from Washington quickly.

A one-stop service has been set up by the Department of Commerce.

▪ If your company is looking for a new plant site, the Dept. of Commerce has put at your disposal all Federal data and policies relating to plant location.

A one-stop service has been set up in the Office of Area Development, U. S. Dept. of Commerce, to provide information on national security and defense, population, labor force, cost of living indexes, state and local finances, tax rates, power rates, manufacturing sites, business trends, and Federal policies on plant location and procurement in areas of labor surplus.

One Package — It's no longer necessary to tour various Federal agencies for bits of information. Management men can get a complete package of government information on plant location matters from the Office of Area Development's Industrial Location Div., housed in the main building of the Commerce Dept., Washington.

The OAD and its Industrial Location Div. have been given responsibility for counseling industry on the national security aspects of new plant location.

Labor Information — In this capacity, OAD has data on potential target areas and effects of modern-day weapons. It also has sources of information on special protective features which can be used in new plant construction and procedures for meeting government security requirements.

In addition, the OAD is a Federal clearing house of informa-

Commerce Dept. Offers These Services

Guidance to Federal data and information useful in plant location work.

Assistance in planning site selection surveys.

Technical data and publications on planned industrial parks.

Reference material on specific site selection factors.

Advice on the security factor of plant location.

Central library of plant location data by regions, states, and communities.

VICTOR ROTERUS: "No need to tour Washington . . . It's all here in one spot . . .

tion on local areas of labor surplus.

Map Your Plans—A streamlined procedure has been set up to help manufacturers requesting official counsel on security and dispersion adequacy of proposed sites. A manufacturer can get this service by indicating the proposed site or sites on a map—an ordinary road map will do—and then sending the marked map to the Industrial Location Div., Office of Area Development, U. S. Dept. of Commerce, Washington 25, D. C.

Location of the site will be checked in relation to urban concentrations of industry and population considered to be prime targets. The map will then be forwarded to the Defense Dept. for a check on possible proximity to key industrial and military installations.

Check is Final—With the results of these checks in hand, manufacturers can proceed with expansion plans. They will not have to consult further with the Government on the dispersion factor.

Counseling under the National Industrial Dispersion Program (set forth in Defense Mobilization Order I-19) is aimed at assisting the manufacturer find an adequately dispersed site in the market area he has selected for his new plant.

Separate Handling—On counseling industry on the security factor in new plant location, dispersion adequacy of specific sites is determined on a case-by-case basis. Although the distance of a new plant from blast effects of nuclear weapons is the controlling factor in reducing the risk of attack damage, consideration must be given many other factors.

They include size and type of the probable target, destructive power of weapons suitable to the particular target, and degree of damage which the proposed plant could sustain.

The economic factors involved in a competitive location must be weighed along with bomb damage considerations in the final choice of a site.

Consider Depressed Areas — Besides its interest in relatively secure locations, the Government has also taken steps to encourage manufacturers to locate new plants in areas classified by the U. S. Dept. of Labor as "areas of substantial labor surplus." At present, there are over 100 of these areas throughout the country.

Federal policies making these areas favorable for the location of new plants provide for: (1) Special consideration to firms located in these areas in the awarding of Government contracts; (2) preferential treatment under the provisions of the Buy American Act; and (3) a special bonus under the tax amortization program.

"Set Aside" Policy—Preference in awarding Government contracts to labor surplus area firms is provided principally through a "set aside" approach under which part of a given procurement is specifically reserved for negotiation with firms located in labor surplus areas.

Usually, a part of the total amount of goods to be purchased is formally advertised and a contract on this portion is awarded to

Data on local taxes, labor supply . .

Or whatever your problem may be."

the lowest qualified bidder without reference to where the material is produced.

Remainder of the total procurement which has been set aside is then negotiated with firms in labor surplus areas which submitted bids on the competitive portion of the procurement.

Higher Differential — The Buy American Act gives preference in Government contracts to domestic suppliers unless their bids are unreasonable or inconsistent with the public interest.

To give labor surplus area bidders an added advantage, a larger differential than the usual 6 pct is granted a domestic bidder who certifies that a substantial amount of the contract will be produced in areas of high labor surplus.

Tax—An Advantage—Under the Government's tax amortization policy for encouraging defense facility buildup, firms producing specified defense items can write off part of the new plant investment in 5 years instead of the usual 20 or 25 years.

Under present law, certificates for such accelerated depreciation allowance are granted only for (1) plants which will produce new or specialized defense items for the Dept. of Defense or Atomic Energy Commission, and (2) plants which will provide research, developmental, or experimental services for these two agencies as a part of the national defense program.

For companies who locate one of these high priority facilities in an area of substantial labor surplus, the percentage of plant and equipment investment allowed the fast write-off will be increased—generally from 10 to 25 pct.

Library Opened—Supplementing the central information file of Federal data, the OAD makes available to manufacturers an industrial location library. It consists of economic surveys and reports on regions, states, and communities.

This data has been assembled in cooperation with such private and public organizations as state planning and development agencies, railroads, utilities, banks, industrial management consulting firms, and local development groups.

Manufacturers and consulting firms, after getting Federal data, are referred to appropriate state and local agencies and industrial departments of railroads and utilities for more detailed information.

INDUSTRIAL PARKS: Commerce Dept. makes available to industry data on new sites such as Fort Washington Industrial Park, Fort Washington, Pa. Note Pennsylvania Turnpike interchange, upper right.

Reprints of this article are available as long as the supply lasts. You can obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Stake Your Claim

in San Bernardino County, California

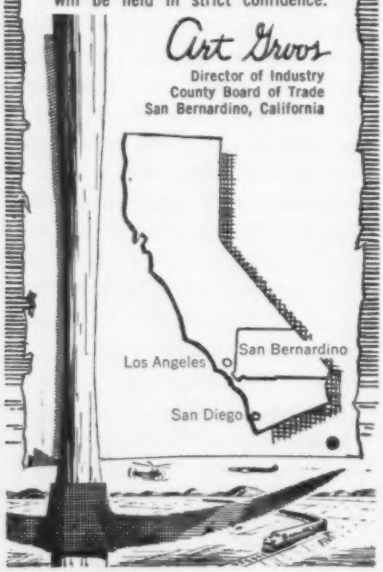
Industry, large and small, is joining the new "GOLD RUSH".

Investigate these facts (there are more, too) about San Bernardino County before you expand or relocate.

- **Planned industrial sites, providing all services.**
- **Over 12 square miles of zoned industrial property. Per acre cost, from $3,000.**
- **Building costs from $4 per square foot.**
- **Industrial power at 8.8 mils average per KWH at 1000 KW demand with monthly usage of 400,000 KWH.**
- **Interruptible industrial gas rates as low as 3 cents per therm. Firm rates, as low as 4 cents per therm.**
- **In the golden market of the Greater Los Angeles area.**
- **Served by four railroads.**
- **Scheduled airline and helicopter passenger and freight service.**
- **Recreational facilities—the finest year-round.**
- **Ideal year-round climate permits unusually corrosion resistant outdoor storage.**

We will be happy to send you literature and answer any specific questions you may have. Your inquiry will be held in strict confidence.

Art Groos
Director of Industry
County Board of Trade
San Bernardino, California



Area Guide To Plant Location

■ The following pages contain a directory of state industrial development agencies, plus the major railroads and utilities in each state which provide specific plant site information. Also included are area development commissions and similar groups which serve communities of 100,000 or more. Since most cities have chambers of commerce —which also provide such data— they are not listed individually here.

Figures below each state show employment of plant workers in metalworking plants with 20 or more and with 100 or more plant workers. (From The Iron Age's "Basic Marketing Data.")

Alabama

Ordnance & Accessories
100 plus: 783; 20 plus: 821

Metal Furniture
100 plus: 300; 20 plus: 467

Primary Metals
100 plus: 42,809; 20 plus: 43,654

Fabricated Metal Products
100 plus: 6,705; 20 plus: 9,194

Machinery (Except Electrical)
100 plus: 2,523; 20 plus: 3,184

Electrical Machinery, Equipment
100 plus: 4,092; 20 plus: 4,500

Transportation Equipment
100 plus: 11,769; 20 plus: 11,889

Instruments, Etc.
100 plus: —; 20 plus: 20

Miscellaneous Manufacturing Industries
100 plus: 225; 20 plus: 461

Alabama Planning and Ind. Dev. Bd., 711 High St., Montgomery 5, P. P. Looney, Dir.; **Men of Montgomery**, Montgomery, K. Reed, Pres.; **Birmingham's Committee of 100**, Birmingham, P. Sieverling, Dir.; **Alabama Power Co.**, Ind. Dev. Dept., Birmingham, W. C. Green, Vice Pres.; **GM&O R.R.**, Mobile, T. Martin, Vice Pres.; Ind. Div., **Alabama State Chamber of Comm.**, 468 South Perry St., Montgomery, L. B. Dickson, Dir.

Arizona

Ordnance & Accessories
100 plus: 1,971; 20 plus: 1,971

Primary Metals
100 plus: 4,889; 20 plus: 4,889

Fabricated Metal Products
100 plus: 600; 20 plus: 841

Machinery (Except Electrical)
100 plus: 965; 20 plus: 985

Electrical Machinery, Equipment
100 plus: 150; 20 plus: 210

Transportation Equipment
100 plus: 6,350; 20 plus: 6,528

Instruments, etc.
100 plus: —; 20 plus: 54

Miscellaneous Manufacturing Industries
100 plus: —; 20 plus: 20

Arizona Dev. Bd., Phoenix, B. M. Mergen, Mgr. **Industrial Dev. Comm.**, Phoenix; **Salt River Power Dist.**, Phoenix; **Arizona Public Service Co.**, Phoenix; **Santa Fe R.R.**, Phoenix; **Southern Pacific R.R.**, Phoenix; **Airport Ind'l. Dev. Comm.**, Phoenix.

Arkansas

Metal Furniture
100 plus: 225; 20 plus: 225

Primary Metals
100 plus: 3,340; 20 plus: 3,553

Fabricated Metal Products
100 plus: 1,105; 20 plus: 1,723

Machinery (Except Electrical)
100 plus: —; 20 plus: 521

Electrical Machinery, Equipment
100 plus: 2,780; 20 plus: 2,901

Transportation Equipment
100 plus: 801; 20 plus: 1,060

Instruments, etc.
100 plus: 1,500; 20 plus: 1,580

Miscellaneous Manufacturing Industries
100 plus: —; 20 plus: 45

Arkansas Ind. Dev. Comm., Little Rock, W. P. Rock, Exec. Secy.; **Arkansas Western Gas Co.**, Fayetteville, L. B. Kendall; **Arkansas Missouri Power Co.**, Blytheville, E. Thomas; **Midsouth Gas & Electric Co.**, Little Rock, R. B. Hill.

California

Ordnance & Accessories
100 plus: 14,981; 20 plus: 15,206

Metal Furniture
100 plus: 4,382; 20 plus: 6,307

Primary Metals
100 plus: 34,561; 20 plus: 41,849

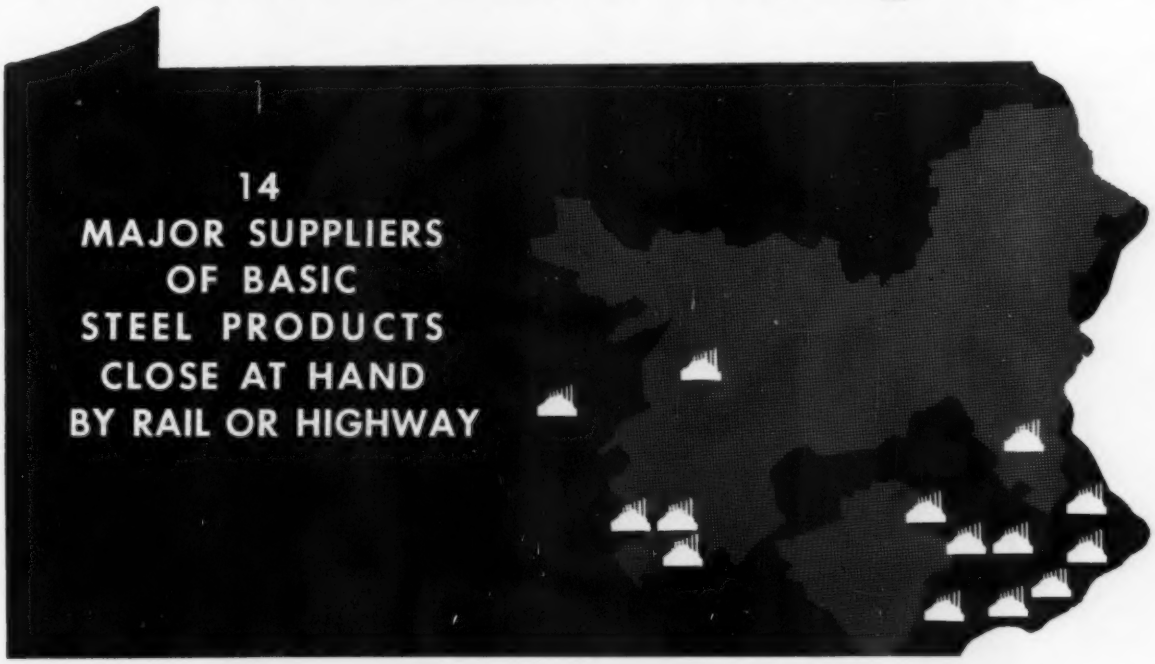
Fabricated Metal Products
100 plus: 47,352; 20 plus: 69,676

Machinery (Except Electrical)
100 plus: 37,157; 20 plus: 55,238

Electrical Machinery, Equipment
100 plus: 54,999; 20 plus: 62,235

Transportation Equipment
100 plus: 233,122; 20 plus: 241,061

STEEL at your doorstep in Central Eastern Pennsylvania



Metalworking industries in Central Eastern Pennsylvania have the basic steel products they need right in their own backyard. With 14 major suppliers in or adjacent to the area . . . first-class highway and rail connections put raw materials in your hands quickly and at low cost. Other necessary materials and equipment . . . from production machinery to product containers . . . are also readily available from area suppliers.

And just as important, you'll find your new plant right in the heart of one of the nation's richest markets. Within a 200-mile radius lives one-third the nation's population . . . a ready-made market for consumer goods, semi-finished products, sub-assembly materials and many other items used by business and industry.

Best of all, a new plant may be built in this heart of the market location without one dollar of capital outlay. You'll find 100% financing available through enterprising community development groups. In addition, *a number of light and heavy metalworking plant facilities are available now for immediate occupancy.*

READY AVAILABLE LABOR SUPPLY

1. Lathe operators
2. Drill press operators
3. Milling machine operators
4. Metal honing operators
5. Blanchard grinders
6. Automatic screw machine operators
7. Toolmakers
8. Maintenance men
9. Machinists
10. Welders
11. Tool and diemakers
12. Industrial mechanics

NO OTHER LOCATION OFFERS SO MUCH TO THE METALWORKING INDUSTRY

Write, wire or phone today for more information to Mr. Daniel L. Diehl, area development director, Pennsylvania Power & Light Company 901 Hamilton Street, Allentown, Pa. Phone HEmlock 4-5151

PENNSYLVANIA POWER & LIGHT COMPANY

MEN WHO BUY STEEL SAY THIS:

"Steel Service Centers give us better production efficiency"

W. W. Scull, Director Manufacturing Services, The B. F. Goodrich Company

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Include Steel Service Center steel *stocks, cutting and handling equipment, storage space* and general service *availability* in your steel buying plans. Perhaps you will find, as The B. F. Goodrich Company did, that your production efficiencies can be improved. American Steel Warehouse Association, Inc., 540 Terminal Tower, Cleveland 13, Ohio.

AMERICAN STEEL WAREHOUSE ASS'N.

The American Steel Warehouse
...YOUR STEEL SERVICE CENTER

Instruments, etc.
100 plus: 9,853; 20 plus: 12,126

Miscellaneous Manufacturing Industries
100 plus: 2,629; 20 plus: 4,614

Long Beach Bd. of Harbor Commrs., 1333 El Embarcadero, E. J. Amar, Gen. Mgr.; **Los Angeles Bd. of Harbor Commrs.**, City Hall, B. J. Coughlin, Gen. Mgr.; **L. A. Dept. of Water & Power**, Box 3669 Terminal Annex, C. H. Dye, Ind. Dev. Engr.; **So. Calif. Gas Co.**, Box 3249 Terminal Annex, L. A., F. M. Banks, Pres.; **So. Cities Gas Co.**, Box 2763, L. A., R. MacIntyre, Mgr.; Sacramento; **Yolo Port Dist.**, Calif. Fruit Bldg., W. G. Stone; **San Bernardino County Bd. of Trade**, 316 Mt. View Ave.; **San Diego Ind. Coordinator**, Civic Center; **San Diego Gas & Electric Co.**, 861 6th Ave., H. D. Craghead; **San Diego Harbor Dept.**, 1365 Harbor Dr.; **San Francisco Bay Area Comm.**, Ferry Bldg., F. E. Marsh, Exec. VP.; **Port of San Francisco**, Ferry Bldg., J. H. Myers, Mgr.; **Pacific Gas & Electric Co.**, 245 Market St.; **So. Pacific Lines**, 65 Market St., S. F. 5, C. D. Lafferty, Mgr., Ind. Dev.

Colorado

Ordnance & Accessories
100 plus: 400; 20 plus: 519

Metal Furniture
100 plus: 300; 20 plus: 320

Primary Metals
100 plus: 9,250; 20 plus: 9,745

Fabricated Metal Products
100 plus: 538; 20 plus: 1,963

Machinery (Except Electrical)
100 plus: 3,409; 20 plus: 4,696

Electrical Machinery, Equipment
100 plus: 2,436; 20 plus: 2,576

Transportation Equipment
100 plus: 1,934; 20 plus: 2,182

Instruments, etc.
100 plus: 534; 20 plus: 621

Miscellaneous Manufacturing Industries
100 plus: 200; 20 plus: 352

Colorado Dept. of Dev., Denver, L. R. Cobb; **Denver & Rio Grande Western R.R.**, Denver.

Connecticut

Ordnance & Accessories
100 plus: 8,063; 20 plus: 8,231

Metal Furniture
100 plus: 1,574; 20 plus: 1,845

Primary Metals
100 plus: 29,903; 20 plus: 32,510

Fabricated Metal Products
100 plus: 29,950; 20 plus: 38,994

Machinery (Except Electrical)
100 plus: 53,288; 20 plus: 59,559

Electrical Machinery, Equipment
100 plus: 20,960; 20 plus: 23,544

Transportation Equipment
100 plus: 64,544; 20 plus: 65,727

Instruments, etc.
100 plus: 16,893; 20 plus: 17,768

Miscellaneous Manufacturing Industries
100 plus: 14,004; 20 plus: 15,613

Connecticut Dev. Comm., Hartford, S. A. Edwards, Mg. Dir.; **Hartford Electric Light Co.**, Area Dev. Dept., Hartford, R. W. O'Donnell, Mgr.; **Connecticut Light & Power Co.**, Area Dev. Dept., Hartford 1, R. P. Lee, Mgr.; **United Illuminating Co.**, New Haven, E. B. Haskell, Commercial & Ind., Mgr.; **Hartford Gas Co.**, Hartford, C. H. Cass; **Southern New England Telephone Co.**, Hartford, A. C. Brown; **New York, New Haven & Hartford R.R. Co.**, Ind. Dev. Dept., Boston, P. Benjamin, Mgr.

Delaware

Primary Metals
100 plus: 3,230; 20 plus: 3,257

Fabricated Metal Products
100 plus: 1,050; 20 plus: 1,663

Machinery (Except Electrical)
100 plus: 836; 20 plus: 1,033

Electrical Machinery, Equipment
100 plus: 127; 20 plus: 127

Transportation Equipment
100 plus: 3,952; 20 plus: 4,063

Instruments, etc.
100 plus: 170; 20 plus: 170

PIONEERS
in manufacture and design of
CRUCIBLES For VACUUM MELTING

Since the practical application of the theory of vacuum melting, Zak Machine Works, Inc., pioneered the design and manufacture of crucibles for vacuum melting in a variety of sizes.

THE ONLY COMPANY to test vacuum pump down and leak rate at the plant and issue a *certification of testing!* This certification guarantees Vacuum Test and Leak Rate measured in microns.

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TROY (GREEN ISLAND) N. Y.

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- The Trane Company
- Daystrom, Inc.
- Federal-Pacific Electric Co.
- Plus many, many more!

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Labor:
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Send for New "Scranton Labor Market Skill Survey"

Utilities:
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Transportation:
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We will build a modern plant to your specs. You build your equity as you pay rent, and a provision in your lease will let you buy your plant any time for the unpaid balance. Write today for details of "The Scranton Plan".

INDUSTRIAL DEPARTMENT
SCRANTON CHAMBER OF COMMERCE
SCRANTON, PA.

"SCRANTON... The Key City in the Keystone State"

AREA DIRECTORY

Miscellaneous Manufacturing Industries
100 plus: 240; 20 plus: 240

Delaware Dev. Dept., Dover, Col. C. B. Shaffer, Acting Dir.; **Committee to Promote Delaware, Inc.**, c/o Delaware Power & Light Co., Wilmington, L. R. Leslie, Pres.; **Regional Planning Comm. of New Castle County**, Wilmington, J. D. Bush, Jr., Chmn.; **Wilmington Planning Comm.**, Wilmington, E. P. Smith Chmn.; **Wilmington Marine Terminal**, Wilmington, R. Cathcart, Dir.; **Delaware Power and Light Co.**, Industrial Div., Wilmington, Col. W. W. P. Pyle.

Florida

Ordnance & Accessories
100 plus: —; 20 plus: 65

Metal Furniture
100 plus: 375; 20 plus: 555

Primary Metals
100 plus: 480; 20 plus: 850

Fabricated Metal Products
100 plus: 3,625; 20 plus: 6,245

Machinery (Except Electrical)
100 plus: 1,200; 20 plus: 2,348

Electrical Machinery, Equipment
100 plus: 815; 20 plus: 1,470

Transportation Equipment
100 plus: 5,323; 20 plus: 5,785

Instruments, etc.
100 plus: —; 20 plus: 143

Miscellaneous Manufacturing Industries
100 plus: 250; 20 plus: 435

Florida Dev. Comm., Tallahassee, B. R. Fuller, Jr., Exec. Dir.; **Dade Co., Dev. Dept.**, Chamber of Commerce Bldg., Miami 32, J. N. Gibson, Dr.; **Florida Power & Light Co.**, Ind. Dev., Miami 30, D. P. Caldwell, Dir.; **Committee of 100**, Jacksonville Area Chamber of Commerce, Jacksonville, B. C. McCaffree, Exec. Dir.; **Ind. Committee, Pensacola Chamber of Commerce**, Pensacola; **Committee of 100, Greater Tampa Chamber of Comm.**, P.O. Box 420, Tampa, A. R. Timberman, Jr., Mgr.; **Palm Beach Co. Resources Dev. Bd.**, P.O. Box 107, West Palm Beach, L. Allen, Mgr.; **Commercial & Ind. Dev., Florida Power Corp.**, St. Petersburg, W. B. Shenk, Dir.; **Pinellas Industry Council**, 1327 Ninth St., South, St. Petersburg, A. L. Lino, Exec. Dir.

Georgia

Ordnance & Accessories
100 plus: 200; 20 plus: 200

Metal Furniture
100 plus: 900; 20 plus: 1,294

Primary Metals
100 plus: 3,281; 20 plus: 3,725

Fabricated Metal Products
100 plus: 3,808; 20 plus: 5,836

Machinery (Except Electrical)
100 plus: 4,489; 20 plus: 6,287

Electrical Machinery, Equipment
100 plus: 2,531; 20 plus: 2,900

Transportation Equipment
100 plus: 19,686; 20 plus: 20,194

Instruments, etc.
100 plus: 615; 20 plus: 669

Miscellaneous Manufacturing Industries
100 plus: 1,050; 20 plus, 1,134

Georgia Dept. of Commerce, Atlanta 3, S. Candler, Secy.; **Central of Georgia Rwy.**, Atlanta, H. Perkins, Gen. Ind. Agent; **State Chamber of Comm.**, Atlanta, W. Cates, Exec. Vice Pres.; **Atlanta & West Point R.R.**, Atlanta, E. S. Center, Gen. Ind. Agent; **Georgia Power Co.**, Atlanta, E. A. Yates; **Savannah Dist. Authority**, Savannah, W. H. McGowan, Exec. Secy.

Idaho

Ordnance & Accessories
100 plus: 549; 20 plus: 549

Primary Metals
100 plus: 650; 20 plus: 670

Fabricated Metal Products
100 plus: 140; 20 plus: 284

Machinery (Except Electrical)
100 plus: —; 20 plus: 189

Idaho Dept. of Comm. & Dev., State House, Boise, Louise Shadduck, Secy.; **Idaho Power Co.**, Boise; Intermountain Gas Co., Boise.

Illinois

Ordnance & Accessories
100 plus: 10,543; 20 plus: 10,643

Metal Furniture
100 plus: 8,272; 20 plus: 10,736

Primary Metals
100 plus: 89,026; 20 plus: 96,448

Fabricated Metal Products
100 plus: 88,351; 20 plus: 115,082

Machinery (Except Electrical)
100 plus: 133,909; 20 plus, 154,806

Electrical Machinery, Equipment
100 plus: 130,551; 20 plus: 139,667

Transportation Equipment
100 plus: 42,967; 20 plus: 45,928

Instruments, etc.
100 plus: 19,164; 20 plus: 21,317

Miscellaneous Manufacturing Industries
100 plus: 14,059; 20 plus: 16,760

Illinois Div. of Ind. Planning and Dev., Springfield, C. W. Bishop, Supt.; **Chicago Assn. of Comm. & Industry**, 1 N. LaSalle St., Chicago, T. H. Coulter, Chief Ex. Off.; **Chicago and Eastern Ill. R.R. Co.**, 332 S. Michigan Ave., Chicago 4; **Chicago & N.W. R.R.**, 400 W. Madison St., Chicago; **Chicago, Burlington & Quincy**, 547 W. Jackson Blvd., Chicago 6; **Chicago, Milwaukee, St. Paul & Pacific R.R.**, Union Station, Chicago 6; **Commonwealth Edison Co.**, 72 W. Adams St., Chicago;; **Monon R.R.**, 608 S. Dearborn St., Chicago 5; **Rock Island Lines**, LaSalle St. Station, Chicago 5; **Peoria Assn. of Commerce**, Peoria; **Central Illinois Light Co.**, Peoria.

Indiana

Ordnance & Accessories
100 plus: 4,955; 20 plus: 4,955

Metal Furniture
100 plus: 4,771; 20 plus: 5,604

Primary Metals
100 plus: 80,251; 20 plus: 84,011

Fabricated Metal Products
100 plus: 29,337; 20 plus: 38,464

Machinery (Except Electrical)
100 plus: 33,097; 20 plus: 41,169

Electrical Machinery, Equipment
100 plus: 67,545; 20 plus: 69,119

Transportation Equipment
100 plus: 82,728; 20 plus: 85,125

Instruments, etc.
100 plus: 873; 20 plus: 1,359

Miscellaneous Manufacturing Industries
100 plus: 5,059; 20 plus: 6,071

Indiana Dept. of Comm. & Public Rel., Indianapolis, W. A. Shepler, Dir.; **Committee of 100**, Evansville, E. Heseman; **Committee of 100**, South Bend, F. R. Henrekin; **Central Indiana Gas Co.**, Muncie, R. Halor; **Northern Indiana Fuel & Light Co.**, Auburn, R. T. Shuttleworth, Mgr.; **Public Service Co. of Indiana, Inc.**, Plainfield, G. S. Dailey; **Indiana Gas and Water Co., Inc.**, Indianapolis, F. W. Dopke, Vice Pres.; **Indiana and Michigan Electric Co.**, Fort Wayne, H. G. Steegman; **Indianapolis Power & Light Co.**, Indianapolis, J. D. Blythe.

Iowa

Metal Furniture
100 plus: 427; 20 plus: 543

Primary Metals
100 plus: 4,437; 20 plus: 5,106

Fabricated Metal Products
100 plus: 5,824; 20 plus: 8,032

Machinery (Except Electrical)
100 plus: 21,707; 20 plus: 24,899

Electrical Machinery, Equipment
100 plus: 10,377; 20 plus: 10,954

Transportation Equipment
100 plus: 3,575; 20 plus: 3,980

Instruments, etc.
100 plus: 2,239; 20 plus: 2,239

Miscellaneous Manufacturing Industries
100 plus: 1,933; 20 plus: 2,157

Iowa Development Comm., Des Moines 9, E. B. Storey, Dir.; **Des Moines Ind. Bureau**, Equitable Bldg., Des Moines, S. Bradley; **Iowa Power and Light Co.**, Des Moines.

Kansas

Ordnance & Accessories
100 plus: 267; 20 plus: 267

Metal Furniture
100 plus: —; 20 plus: 62

Primary Metals
100 plus: 1,158; 20 plus: 1,550

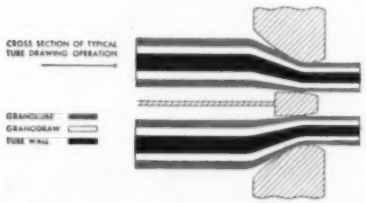
Fabricated Metal Products
100 plus: 3,463; 20 plus: 4,673

Machinery (Except Electrical)
100 plus: 4,188; 20 plus: 5,892

CHEMICAL CONVERSION COATINGS and their functions in facilitating the cold mechanical deformation of metals

By ARTHUR DAHL, Product Development Dept., AMERICAN CHEMICAL PAINT COMPANY

When used to facilitate the cold mechanical deformation of metals (in drawing, extrusion, stamping, cold heading, necking, and upsetting operations) chemical conversion coatings in conjunction with suitable lubricants perform three important functions. One, they prevent metal-to-metal contact between work and tool. Two, they prevent galling and seizing. Three, they protect stock indefinitely, permitting the storage of in-process work at any stage of production, without danger of corrosion damage.



Characteristic of the tightly bound, highly absorptive, crystalline coating formed by the processes is the ability of the coating to retain lubricity throughout forming operations when treated with a suitable lubricant. This offers the following production advantages:

- **Higher degree of reduction**
- **Greater speed of draw**
- **Longer tool life**
- **Fewer process anneals and pickling**
- **Finer surface finish**
- **Cleaner mills**
- **Easier inspection of finished product**

Also of interest to production men is the exact duplication of coatings from batch to batch. And the processes are much simpler than other methods of coating metals—baths can be set up and running in less time than it takes to determine suitable coatings by other methods.

TYPES OF COATINGS AND THE METALS FOR WHICH THEY ARE DESIGNED

Zinc phosphate coatings for carbon steel. These coatings can be applied by either dip or spray systems.

Dip. ACP Granodraw No. 1 is typical of the dip process. The sequence includes precleaning, water rinse, pickling, water rinse, water rinse, Granodraw No. 1 solution, water rinse, and a hot neutralizing rinse. Surfaces to be treated must be free of oil, grease, rust and scale. The above sequence insures that they will be. And when metal is free of rust and scale, the pickling bath and two succeeding water rinses can be omitted. In either case, a lubricant like ACP Granolube or conventional lubricant must be applied prior to working the metal.

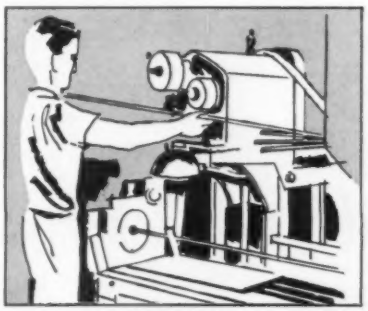
Spray. ACP Granodraw No. 4 is an example of the spray process. It usually requires 5-stage equipment and includes the following steps: precleaning, water rinse, Granodraw No. 4 solution, water rinse, lubricant. After chemical treatment, the work must be dried before forming.

Oxalate Coatings for the stainless steels and many of the high nickel alloys. These coatings are applied only by immersion process, and usually in a 5-stage system which includes an acid pickling or depassivating bath, a water rinse, the ACP Granodraw SS coating bath, a hot borax neutralizing rinse for wire stock, or a lubricating bath for tube stock. Since thorough activation of the metal surface is necessary to promote an adherent coating, the pickling and activating bath is an important stage in processing.

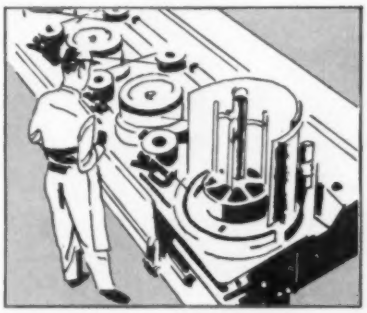
Fluoride-type coatings for zirconium and its alloys. Granodraw ZR is such a coating. It is applied in an immersion process which includes precleaning, water rinse, pickling, water rinse, Granodraw ZR solution, water rinse, drying or lubricating. It has been used primarily in the treatment of stock prior to wire drawing and tube drawing. Surfaces are cleaned of oil and grease by solvent degreasing or alkali cleaning. Pickling is required to provide a surface that is chemically and metallurgically receptive to the coating.

Strong alkali coatings for tantalum and amorphous phosphate coatings for aluminum. These two types of coatings are now in the development stage. Laboratory and field tests are being conducted, results are being evaluated, and modifications in chemical makeup and process sequence are being made to meet requirements. Several field tests, however, have indicated that they will do the same job for tantalum and aluminum processors as the other types of coatings have done for those working carbon steel, stainless steel, high-nickel alloy, and zirconium.

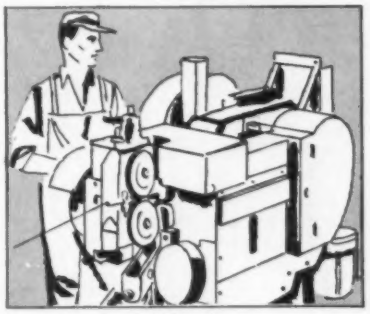
For more information write us at Ambler.



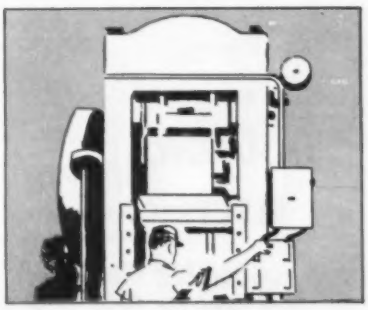
Tube Drawing



Wire Drawing



Cold Heading



Impact Extrusion

Note. Granodraw and Granolube are registered trademarks of American Chemical Paint Company.

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ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

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at your Service for...
TRANSPORTATION EQUIPMENT
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ESTABLISHED 1914
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AREA DIRECTORY

Electrical Machinery, Equipment
100 plus: 785; 20 plus: 985

Transportation Equipment
100 plus: 40,972; 20 plus: 41,766

Instruments, etc.
100 plus: —; 20 plus: 28

Miscellaneous Manufacturing Industries
100 plus: —; 20 plus: 110

Kansas Ind. Dev. Comm., State Office Bldg., Topeka, J. H. Sticher, Dir.; **Central Kansas Ind. Dev. Assn.**, Lyons; **South Central Kansas Regional Dev. Council**, Miller Bldg., Wichita; **Kansas City Power & Light Co.**, Kansas City, Kansas; **Kansas Power & Light Co.**, 800 Kansas Ave., Topeka; **Kansas Gas & Electric Co.**, Wichita; **Atchison, Topeka & Santa Fe Ry.**, Topeka.

Kentucky

Ordnance & Accessories
100 plus: 1,400; 20 plus: 1,400

Metal Furniture
100 plus: 364; 20 plus, 586

Primary Metals
100 plus: 8,029; 20 plus: 8,602

Fabricated Metal Products
100 plus: 8,933; 20 plus: 10,358

Machinery (Except Electrical)
100 plus: 7,215; 20 plus: 8,152

Electrical Machinery, Equipment
100 plus: 20,041; 20 plus: 20,487

Transportation Equipment
100 plus: 5,850; 20 plus: 5,892

Instruments, etc.
100 plus: 594; 20 plus: 619

Miscellaneous Manufacturing Industries
100 plus: 164; 20 plus: 397

Eastern Kentucky Regional Planning Comm., Dept. of Economic Dev., Frankfort, G. W. Hubley, Jr., Comm.; **Louisville Ind. Foundation**, Louisville; **Lexington Ind. Foundation**, Lexington; **Kentucky Utilities Co.**, Lexington; **Louisville Gas & Electric Co.**, Louisville; **Kentucky Power Co.**, Ashland; **Union Light, Heat & Power Co.**, Covington; **Texas Gas Transmission Co.**, Owensboro; **Western Kentucky Gas Co.**, Owensboro; **Louisville & Nashville R.R.**, Louisville, **Frankfort & Cincinnati R.R. Co.**, Frankfort; **Southern Rwy. System**, Louisville; **Kentucky & Indiana Terminal R.R. Co.**, Louisville; **Illinois Central R.R.**, Louisville.

Louisiana

Ordnance & Accessories
100 plus: 450; 20 plus: 450

Metal Furniture
100 plus: —; 20 plus: 115

Primary Metals
100 plus: 3,607; 20 plus: 3,772

Fabricated Metal Products
100 plus: 4,294; 20 plus: 5,712

Machinery (Except Electrical)
100 plus: 1,504; 20 plus: 2,225

Electrical Machinery, Equipment
100 plus: —; 20 plus: 30

Transportation Equipment
100 plus: 6,210; 20 plus: 6,695

Miscellaneous Manufacturing Industries
100 plus: 275; 20 plus: 330

Louisiana Dept. of Commerce and Industry, P.O. Box 4185, Baton Rouge 4, C. Siegelin, Exec. Dir.; **Louisiana Power and Light Co.**, New Orleans, J. M. Mooney; **New Orleans Public Service, Inc.**, New Orleans, J. F. Morton; **Southwestern Gas & Electric Co.**, 428 Travis St., Shreveport, J. B. Struwe.

Maine

Ordnance & Accessories
100 plus: 550; 20 plus: 550

Metal Furniture
100 plus: —; 20 plus: 25

Primary Metals
100 plus: 465; 20 plus: 522

Fabricated Metal Products
100 plus: 935; 20 plus: 1,396

Machinery (Except Electrical)
100 plus: 3,130; 20 plus: 3,358

Electrical Machinery, Equipment
100 plus: 600; 20 plus: 740

Transportation Equipment
100 plus: 3,644; 20 plus: 3,758

Miscellaneous Manufacturing Industries
100 plus: 175; 20 plus: 175

Maine Dept. of Economic Dev., State Capitol, Augusta, F. A. Clough, Jr., Comm.; **Maine Industrial Bldg. Auth.**, State Capitol, Augusta, C. G. Lane, Chmn.; **Bangor & Aroostook R.R.**, Bangor, H. Cousins; **Maine Central R.R.**, Portland, J. Scully; **Central Maine Power Co.**, Augusta, H. F. Schnurle; **Greater Portland Area Dev. Council**, 142 Free St., Portland, E. S. Martin, Mgr.

Maryland

Ordnance & Accessories
100 plus: 229; 20 plus: 229

Metal Furniture
100 plus: 829; 20 plus: 1,212

Primary Metals
100 plus: 37,072; 20 plus: 37,878

Fabricated Metal Products
100 plus: 10,437; 20 plus: 13,673

Machinery (Except Electrical)
100 plus: 5,553; 20 plus: 7,331

Electrical Machinery, Equipment
100 plus: 9,499; 20 plus: 10,204

Transportation Equipment
100 plus: 35,532; 20 plus: 36,048

Instruments, etc.
100 plus: 916; 20 plus: 1,082

Miscellaneous Manufacturing Industries
100 plus: 586; 20 plus: 1,163

Maryland Planning Comm., 100 Equitable Bldg., Baltimore 2, I. A. Pasarew, Dir.; **Anne Arundel County Trade Council, Inc.**, Carvel Hall Hotel, Annapolis; **Baltimore Gas & Electric Co.**, Industrial Dev. Service, 1103

A hot steel circle ready for Claymont's 3000-ton head press. This precision machine is capable of hot or cold pressing heads up to 10 feet in diameter in a wide variety of metals. Integrated facilities make Claymont a reliable source of quality steel plate and plate products for industry.

by d'Arazien

CLAYMONT PRESSED HEADS

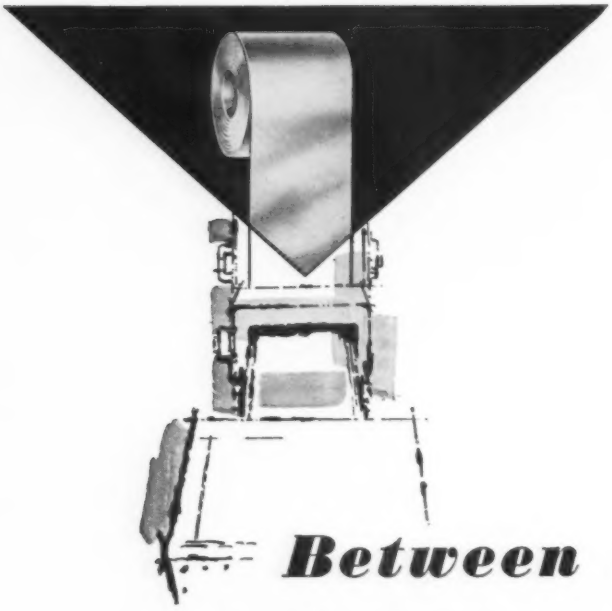
CF&I

CHECK CLAYMONT FOR—Alloy Steel Plates • Carbon Steel Plates • Stainless-Clad Steel Plates High Strength Low Alloy Steel Plates • CF&I Lectro-Clad Nickel Plated Steel Plates • Pressed and Spun Steel Heads • Manhole Fittings and Covers • Fabricated Steel Products Large Diameter Welded Steel Pipe

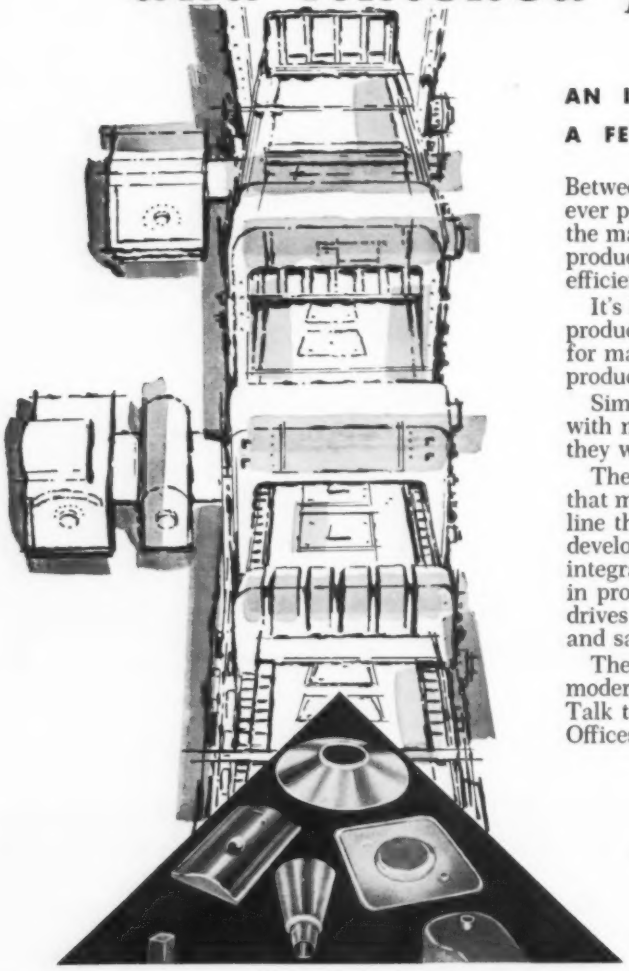
PRODUCTS OF WICKWIRE SPENCER STEEL DIVISION • THE COLORADO FUEL AND IRON CORPORATION

Plant at Claymont, Delaware • Sales Offices in all Key Cities

5744



Between material and finished part . . .



AN IDEA THAT MAKES SENSE —
A FEDERAL-WARCO PRODUCTION LINE

Between material and finished part is the ever present problem of bringing together the machinery necessary to perform all production on operations as speedily and efficiently as possible.

It's here, the Federal-Warco, this packaged production line has proved to be the answer for many of the nation's foremost production experts.

Simply provide Federal-Warco engineers with material and part information and they will develop a line to do the job.

The advantages: One source responsibility that means faster, more thorough service; a line that is 100% harmonic, all stations developed especially to work in synchronization; integrated and automated handling of work in process; the possibility of utilizing common drives and bases, reducing operating costs and saving valuable floor space.

There is much more. Why not look into this modern method of production line manufacture? Talk to your Federal-Warco representative. Offices in all leading industrial areas.

Federal / Warco
PACKAGED
PRODUCTION LINES

THE FEDERAL MACHINE AND WELDER COMPANY • WARREN, OHIO

Lexington Bldg., Baltimore 3; **Maryland Port Authority,** 10 Light St., Baltimore 2; **Baltimore & Ohio R.R. Co.,** B & O Bldg., Baltimore 1; **Western Maryland R.R. Co.,** 300 St. Paul Place, Baltimore 2.

Massachusetts

Ordnance & Accessories
100 plus: 6,310; 20 plus: 6,680

Metal Furniture
100 plus: 3,676; 20 plus: 4,602

Primary Metals
100 plus: 17,202; 20 plus: 21,192

Fabricated Metal Products
100 plus: 20,407; 20 plus: 32,087

Machinery (Except Electrical)
100 plus: 38,263; 20 plus: 48,979

Electrical Machinery, Equipment
100 plus: 79,811; 20 plus: 83,275

Transportation Equipment
100 plus: 28,384; 20 plus: 29,398

Instruments, etc.
100 plus: 16,094; 20 plus: 17,871

Miscellaneous Manufacturing Industries
100 plus: 14,870; 20 plus: 17,967

Massachusetts Dept. of Commerce, 334 Boylston St., Boston 16, J. T. Burke, Comm.; **Berkshire County Ind. Dev. Comm.,** Pittsfield, P. C. Ahearne; **Cambridge Ind. Comm.,** 500 Memorial Drive, Cambridge 39, F. W. Townsend, Chmn.; **Fall River Ind. Comm.,** W. A. Walker, Exec. Dir.; **New Bedford Ind. & Dev. Comm.,** 1st National Bank Bldg., M. Hallward, Exec. Dir.; **Plymouth Ind. & Dev. Comm.,** Plymouth Town Hall, H. W. Barnes; **Springfied Ind. Dev. Comm.,** City Hall, H. Greenberg; **New York, New Haven & Hartford R.R.,** Ind. Dev. Div., South Station, Boston, P. E. Benjamin, Mgr.; **Boston & Maine R.R.,** 150 Causeway St., Boston, E. F. Reed, Mgr. of Ind. Dev.; **Boston Committee for 100,** City Hall, Boston, P. H. Hines, Ind. Adv.; **New England Electric Systems Co.,** 441 Stuart St., Boston; **New England Gas & Electric Assn.,** 727 Mass. Ave., Cambridge; **Boston Gas Co.,** 100 Arlington St., Boston; **Lowell Gas Co.,** E. Merrimack St., Lowell.

Michigan

Ordnance & Accessories
100 plus: 2,513; 20 plus: 2,513

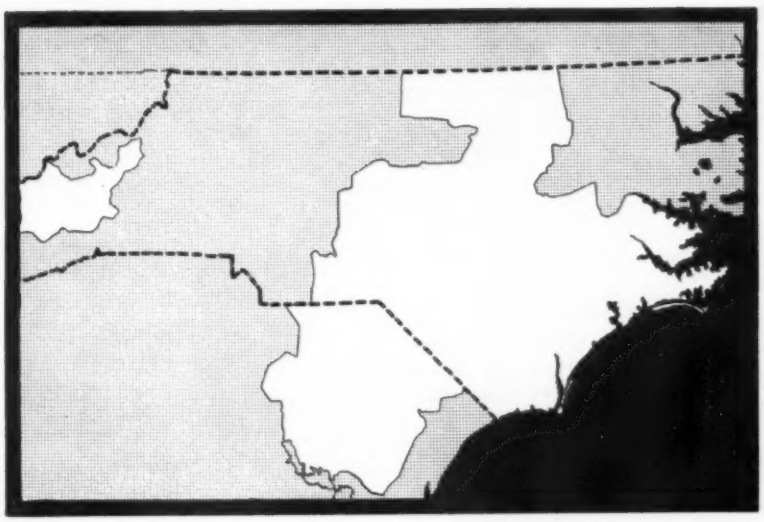
Metal Furniture
100 plus: 10,791; 20 plus: 12,134

Primary Metals
100 plus: 63,709; 20 plus: 71,326

Fabricated Metal Products
100 plus: 59,454; 20 plus: 79,801

Machinery (Except Electrical)
100 plus: 84,830; 20 plus: 110,102

Electrical Machinery, Equipment
100 plus: 36,680; 20 plus: 39,856



THE PROPHETS SAW PROFITS

Recognizing profit potential in a Carolinas location, foresighted manufacturers of metal products — from screws to missiles — made their move. Today these prophets are well-pleased with that move and their profits. Here's what they have found:

1. **LABOR . . .** plenty of intelligent hometown workers who appreciate employment opportunity — plus a labor reserve to accommodate expansion needs.
2. **INDUSTRIAL CLIMATE . . .** whole-hearted cooperation with industry. Many communities will erect and lease facilities.
3. **LOCATION . . .** within 600 miles of half the total U. S. population.
4. **NEW LEGISLATION . . .** right-to-work laws and modernized tax structures — fair to all industries.
5. **CONSTRUCTION ECONOMY . . .** one of the nation's lowest building cost areas.

. . . and, of course, excellent transportation, utilities and living conditions.

May we provide you with our plant location service? No obligation. Your inquiry kept in strict confidence.

CAROLINA POWER & LIGHT COMPANY

D. E. Stewart, Mgr., Area Development Dept.,
Raleigh, N. C.
Telephone TEmple 2-4611

THE HEAVIER THE LOAD...

the more you need HYATTS . . . because size for size, no other kind of bearing made can equal straight cylindrical roller bearings for sheer load-carrying capacity in heavy-duty service. That's why John Deere uses HYATTS in this combine.

THE HIGHER THE SPEED...

the more you need HYATTS . . . because their uncompromising combination of superior steels, precision manufacture and scrupulous control of internal clearances assures smoother performance in high-speed applications like the famed *Firebird II*.

THE MORE YOU NEED *Cylindrical* HY-ROLL BEARINGS

Today, with loads and speeds trending upward and space often at a premium, many a manufacturer is finding that bearings of limited capacity are no longer good enough. If you are seeking ways to squeeze better life/load ratings into smaller housings, HYATT has the answer. Shouldered-race HYATT HY-ROLLS will not only solve your radial load problem but take a surprising amount of thrust, too. Ask your nearest HYATT Sales Engineer for recommendations—he's a mighty good man to know! Hyatt Bearings Division, General Motors Corporation, Harrison, N.J.; Pittsburgh; Detroit; Chicago; and Oakland, California.

THE RECOGNIZED LEADER IN CYLINDRICAL BEARINGS

GM GENERAL MOTORS

HYATT HY-ROLL BEARINGS

THE "WORKHORSES" OF MODERN INDUSTRY

Transportation Equipment
100 plus: 331,082; 20 plus: 336,128

Instruments, etc.
100 plus: 4,824; 20 plus: 5,365

Miscellaneous Manufacturing Industries
100 plus: 3,828; 20 plus: 5,773

Michigan Dept. of Economic Dev., Lansing 26, D. C. Weeks, Dir.; **Ann Arbor R.R.**, Owosso, G. E. Stange; **Detroit & Mackinac Rwy.**, Tawas City, F. E. Catto, Dir. of Ind. Dev.; **Consumers Power Co.**, Industrial Dev. Dept., Jackson, H. L. Brewer, Dir.; **Detroit Edison Co.**, Area Dev. Div., Second Blvd., Detroit, V. Madison, Dir., **Michigan Consolidated Gas Co.**, Industrial Dev. Div., Clifford St., Detroit, R. L. Gage, Mgr.; **Port of Detroit Comm.**, Guardian Bldg., Detroit 26, C. J. Stettin, Port Dir.

Minnesota

Ordnance & Accessories
100 plus: 1,815; 20 plus: 1,815

Metal Furniture
100 plus: 225; 20 plus: 523

Primary Metals
100 plus: 4,219; 20 plus: 5,576

Fabricated Metal Products
100 plus: 7,562; 20 plus: 11,654

Machinery (Except Electrical)
100 plus: 21,062; 20 plus: 26,015

Electrical Machinery, Equipment
100 plus: 8,280; 20 plus: 9,620

Transportation Equipment
100 plus: 3,515; 20 plus: 4,202

Instruments, etc.
100 plus: 8,829; 20 plus: 8,964

Miscellaneous Manufacturing Industries
100 plus: 864; 20 plus: 1,375

Minnesota Dept. of Business Dev., St. Paul 1, L. W. Marsh, Dep. Comm., **Northern States Power Co.**, Minneapolis, S. F. McGowan; **Northern Pacific R.R.**, St. Paul 1, P. D. Edgell; **Great Northern Rwy.**, St. Paul 1, E. N. Duncan; **Minneapolis, Northfield & Southern R.R.**, Minneapolis, M. L. Davenport, **Minneapolis & St. Louis Rwy.**, Minneapolis, F. E. Clawson; **Minneapolis, St. Paul & Sault Ste. Marie Rwy.**, Minneapolis, G. T. Bergren; **Minnesota Power and Light Co.**, Duluth, H. Cooper; **Minneapolis Area Dev. Corp.**, Minneapolis, W. Eastman, Exec. Dir.

Mississippi

Metal Furniture
100 plus: 170; 20 plus: 238

Primary Metals
100 plus: 137; 20 plus: 293

Fabricated Metal Products
100 plus: 1,091; 20 plus: 1,762

Machinery (Except Electrical)
100 plus: 1,519; 20 plus: 2,061

Electrical Machinery, Equipment
100 plus: 1,937; 20 plus: 2,022

Transportation Equipment
100 plus: 4,075; 20 plus: 4,238

Miscellaneous Manufacturing Industries
100 plus: 560; 20 plus: 560

Mississippi Agricultural & Ind. Bd., State Office Bldg., Jackson, H. Maddox, Exec. Dir.; **Mississippi Valley Gas Co.**, Jackson, F. Plummer, Mgr., Ind. Dept.; **Mississippi Power & Light Co.**, Jackson, F. Smith, Mgr., Dev. Dept.; **Gulfport Port Comm.**, Gulfport, R. B. Swenson.

Missouri

Ordnance & Accessories
100 plus: 6,450; 20 plus: 6,474

Metal Furniture
100 plus: 3,103; 20 plus: 3,720

Primary Metals
100 plus: 9,160; 20 plus: 10,334

Fabricated Metal Products
100 plus: 16,661; 20 plus: 22,042

Machinery (Except Electrical)
100 plus: 9,615; 20 plus: 14,029

Electrical Machinery, Equipment
100 plus: 24,417; 20 plus: 25,627

Transportation Equipment
100 plus: 38,875; 20 plus: 39,978

In Metalworking . . .

SKILL IS THE MAINE FACTOR!

QUALITY built into State of Maine products by skilled, ingenious workmen is famous throughout the world. Right now, a number of "blue chip" Maine metalworking plants, with complete facilities ranging from foundry to high-precision machining have surplus capacity for everything—right up to jet, missile and instrumentation components. And at low unit production costs that will amaze you!

In addition, the new

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DEPARTMENT OF ECONOMIC DEVELOPMENT
STATE CAPITOL AUGUSTA, MAINE

AREA DIRECTORY

Instruments, etc.
100 plus: 1,821; 20 plus: 2,306

Miscellaneous Manufacturing Industries
100 plus: 931; 20 plus: 1,965

Missouri Div. of Resources and Dev., Jefferson City, J. D. Idol, Dir.; **Mid-Missouri Dev. Council**, Municipal Bldg., Columbia, C. C. Isely, Jr.; **Kansas City Power & Light Co.**, Kansas City, G. S. Young; **Gas Service Co.**, Kansas City, J. U. Cormany; **Missouri Public Service Co.**, Kansas City, C. J. Mason, Vice Pres.; **Union Electric Co.**, St. Louis, J. E. Johanson; **St. Louis-San Francisco R.R. Co.**, E. A. Williams, Dir. of Dev.; **Kansas City Southern Lines**, Kansas City 6, D. T. McMahan, Dev. Dept.; **Wabash R.R. Co.**, St. Louis 1, H. H. McIntyre, Dir. of Dev.; **Missouri Pacific Lines**, St. Louis 3, E. S. Reed, Dir., Ind. Dev.; **Chicago Great Western R.R.**, Kansas City, B. R. Harris, Vice Pres.

Montana

Primary Metals
100 plus: 4,200; 20 plus: 4,290

Fabricated Metal Products
100 plus: —; 20 plus: 173

Machinery (Except Electrical)
100 plus: —; 2 plus: 95

Transportation Equipment
100 plus: —; 20 plus: 20

Montana State Planning Bd., Helena, P. F. Roys, Dir.; **Montana Power Co.**, Butte, R. C. Setterstrom; **Central Montana Ind. and Economic Dev. Corp.**, Lewistown, L. Belding, Secy.

Nebraska

Metal Furniture
100 plus: —; 20 plus: 175

Primary Metals
100 plus: 320; 20 plus: 507

Fabricated Metal Products
100 plus: 2,590; 20 plus: 3,000

Machinery (Except Electrical)
100 plus: 1,545; 20 plus: 2,751

Electrical Machinery, Equipment
100 plus: 2,842; 20 plus: 3,065

Transportation Equipment
100 plus: 872; 20 plus: 1,197

Instruments, etc.
100 plus: 1,180; 20 plus: 1,236

Miscellaneous Manufacturing Industries
100 plus: 350; 20 plus: 375

Div. of Nebraska Resources, Lincoln, C. V. Price, Chief; **Omaha Ind. Foundation**, Omaha, M. L. Woodburn, Dir.; **Northern Natural Gas Co.**, Omaha; **Lincoln Ind. Dev. Corp.**, Lincoln.

Nevada

Primary Metals
100 plus: 1,603; 20 plus: 1,603

Fabricated Metal Products
100 plus: —; 20 plus: 52

Miscellaneous Manufacturing Industries
100 plus: —; 20 plus: 25

Nevada Dept. of Economic Dev., Carson City, P. Kelly, Dir.; **State Planning Bd.**, Carson City, G. Bissell, Mgr.; **Sierra Pacific Power Co.**, Ind. Dev. Div., Reno, F. Talley; **Southern Nevada Power Co.**, Ind. Dev. Div., Las Vegas, C. Waite.

New Hampshire

Metal Furniture
100 plus: 300; 20 plus: 355

Primary Metals
100 plus: 764; 20 plus: 1,031

Fabricated Metal Products
100 plus: 837; 20 plus: 1,640

Machinery (Except Electrical)
100 plus: 5,869; 20 plus: 6,587

Electrical Machinery, Equipment
100 plus: 5,184; 20 plus: 5,334

Transportation Equipment
100 plus: 3,579; 20 plus: 3,619

Instruments, etc.
100 plus: 140; 20 plus: 190

Miscellaneous Manufacturing
100 plus: 110; 20 plus: 164

New Hampshire Planning & Dev. Comm., Ind. Div., Concord, W. L. Foss, Ind. Dir.

It's Better In Bucks*

Like the fellow seeking new business who only wants the opportunity to bid — we're confident! All we ask is that you look — then compare — before you decide on a location for your new plant.

We know it's better in Bucks (Bucks County, Pennsylvania) and we want you to know, too. Bucks is:

- Overnight from ⅓ of the nation's population
- Half-way between New York and Philadelphia markets
- On main lines of Pennsylvania & Reading Railroads
- Serviced by eighty-seven trucking lines
- Bordered by 22 miles of waterfront on the Delaware River
- Supplied with a large, high-calibre labor pool.

There is housing for everybody, from the world's largest planned community to the most gracious country living in Colonial mansions across our beautiful countryside.

It's a Utopia for industry and living, and there are more than 100 prime industrial sites that you should know about. To help you in this important consideration we suggest you write or call Gordon R. Exley at Fillmore 8-2651. He'll be happy to give you full details as to why it's better in Bucks.

P.S. Check, too, on the unique advantages of Pennsylvania's 100% financing plan.

BUCKS COUNTY INDUSTRIAL DEVELOPMENT CORPORATION

50 NORTH MAIN STREET • DOYLESTOWN, PA.

New Jersey

Ordnance & Accessories
100 plus: 3,328; 20 plus: 3,458

Metal Furniture
100 plus: 3,254; 20 plus: 4,028

Primary Metals
100 plus: 31,600; 20 plus: 35,936

Fabricated Metal Products
100 plus: 26,937; 20 plus: 40,347

Machinery (Except Electrical)
100 plus: 37,291; 20 plus: 47,925

Electrical Machinery, Equipment
100 plus: 83,089; 20 plus: 88,260

Transportation Equipment
100 plus: 40,834; 20 plus: 42,873

Instruments, etc.
100 plus: 11,674; 20 plus: 12,744

Miscellaneous Manufacturing
100 plus: 10,594; 20 plus: 12,848

New Jersey Dept. of Conservation and Economic Dev., State House Annex, Trenton, J. E. McLean, Comm.; **Jersey Central Lines**, 143 Liberty St., New York 6, R. E. Rowland; **Elizabethtown Consolidated Gas Co.**, W. Jersey St., Elizabeth 4, R. E. Crane; **Public Service Electric & Gas Co.**, 80 Park Place, Newark, C. S. Cronkright, Mgr., Area Dev.; **New Jersey Manufacturers Assn.**, Trenton, H. W. Johnson, Pres.; Mercer County Ind. Comm., Court House, Trenton 10, F. J. Black, Dir.; **Middlesex County Ind. Comm.**, County Records Bldg., New Brunswick, D. Nelson, Ind. Comm.; **Paterson Ind. Comm.**, City Hall, Paterson 1, R. P. Gambatese, Exec. Sec'y.; **Burlington County Planning Bd.**, Mount Holly, G. M. Rogers, Ind. Rep.; **Monmouth County Planning Bd.**, Ind. Dev. Dept., Hall of Records, Freehold, J. Latta, Dir; **Southern N. J. Dev. Council**, 9 Boardwalk Arcade, Atlantic City, C. R. Wood, Dir.

New Mexico

Primary Metals
100 plus: 1,000; 20 plus: 1,000

Fabricated Metal Products
100 plus: 800; 20 plus: 1,084

Machinery (Except Electrical)
100 plus: —; 20 plus: 20

Transportation Equipment
100 plus: —; 20 plus: 90

Miscellaneous Manufacturing
100 plus: 100; 20 plus: 184

New Mexico Economic Dev. Comm., Santa Fe, J. Wentworth, Dir.; **Public Service Co. of New Mexico**, Albuquerque, D. W. Reeves.

New York

Ordnance & Accessories
100 plus: 35,280; 20 plus: 35,408

Metal Furniture
100 plus: 7,136; 20 plus: 11,722

Primary Metals
100 plus: 74,754; 20 plus: 81,774

Fabricated Metal Products
100 plus: 53,636; 20 plus: 81,041

Machinery (Except Electrical)
100 plus: 90,319; 20 plus: 109,025

Electrical Machinery, Equipment
100 plus: 107,510; 20 plus: 117,936

Transportation Equipment
100 plus: 109,521; 20 plus: 113,077

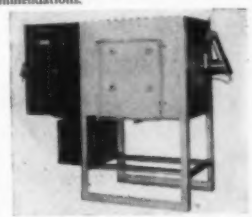
Instruments, etc.
100 plus: 75,509; 20 plus: 79,635

NOW

TAKE THE SIN OF SPOILAGE OUT OF SINTERING with Hayes "application-rated" furnaces!

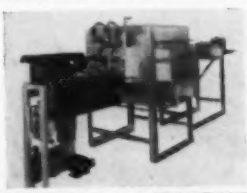
For Ferrous or Non-Ferrous Powder Compacts, Hayes has an atmosphere or a vacuum furnace to suit your sintering needs . . . in research, pilot production, quantity production, or specialty sintering. For optimum results at lowest cost, request complete data on any furnace shown . . . or for unusual applications, request obligation-free "Results Guaranteed" recommendations.

FOR RESEARCH and PRODUCTION Hayes Type MY furnaces (molybdenum-wound element) provide uniform heat to over 3000° F. These low cost units can be used with variety of reducing atmospheres . . . are perfect for sintering research . . . or production at high temperatures. Hayes high temperature vacuum cold-wall furnaces also provide production facilities for applications over 3000° F.



FOR PILOT PRODUCTION Hayes Type BA-M pusher furnaces are inexpensive, offer controlled-atmosphere, straight-through models with water-cooled cooling chambers. Suitable for batch, manual or automatic pusher operation . . . up to temperatures of 2150° F. Wide size range to suit any pilot-scale project on powdered metal compacts. Also available in conveyor type furnaces for production use.

FOR QUANTITY PRODUCTION Hayes Type LAC conveyor furnaces: belt furnaces offer continuous, automatic, uniform sintering of compacts at temperatures up to 2100° F. . . . with pusher type handling heavier parts requiring temperatures to 2350° F. Both designs offer zone temperature control . . . and preheat sections, if desired . . . making *standard units* suitable for stainless steel work.



FOR SPECIALTY SINTERING Hayes Type BA pusher furnaces are special, wide-temperature-range sintering and impregnating furnaces suitable for 2350° F operation. Can be used with varied atmospheres . . . with automatic, electro-hydraulic pusher system for maintaining constant time/temperature cycles for batch or production.

ACT NOW! Request complete data on these furnaces, on atmosphere equipment, or any allied products in Hayes well-known CERTAIN CURTAIN electric furnace line. Write today!

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ELECTRIC FURNACES

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Established 1905

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Please send me complete data on sintering equipment suitable for:

☐ RESEARCH
☐ PILOT PRODUCTION
☐ QUANTITY PRODUCTION
☐ SPECIALTY SINTERING (You name it!)
☐ ATMOSPHERE EQUIPMENT

Name _____ *Title* _____
Company _____
Street _____
City _____ *State* _____

Miscellaneous Manufacturing
100 plus: 16,545; 20 plus: 24,550

New York Dept. of Commerce, Albany, E. T. Dickinson, Comm., **Albany Port District Comm.,** Admin. Bldg., Port of Albany, F. W. Dunham, Jr., Gen. Mgr.; **Tri-City Area Dev. Council,** Capitol Station, Albany, E. J. Doherty, Chmn.; **Delaware & Hudson R. R.,** 413 D&H Bldg., K. C. Lewis; **Buffalo Div. of the Port,** City Hall, Buffalo; **D. L. & W. R.R.,** 140 Cedar St., N. Y., A. C. Hopkins, Mgr. of Ind. Dev.; **General Public Utilities Corp.,** 67 Broad St., N. Y., W. J. Jamieson, Area Dev. Dir.; **Port of N. Y. Authority,** 111-8th Ave., N. Y., W. Gordon; **New York Central System,** 466 Lexington Ave., New York, W. J. Marshall, Mgr., Ind. Dev.; **New York, New Haven & Hartford R. R.,** Grand Central Terminal, N. Y., J. M. Graham; **Niagara Mohawk Power Corp.,** 330 West Erie Blvd., Syracuse, E. J. Machold, Pres.; **Utica Ind. Corp.,** 8 Elizabeth St., Utica, V. R. Corrou, Sec'y.

North Carolina

Ordnance & Accessories
100 plus: 760; 20 plus: 795

Metal Furniture
100 plus: 778; 20 plus: 1,164

Primary Metals
100 plus: 1,432; 20 plus: 2,109

Fabricated Metal Products
100 plus: 1,859; 20 plus: 3,680

Machinery (Except Electrical)
100 plus: 5,207; 20 plus: 7,954

Electrical Machinery, Equipment
100 plus: 10,421; 20 plus: 10,495

Transportation Equipment
100 plus: 801; 20 plus: 1,434

Instruments, etc.
100 plus: 100; 20 plus: 150

Miscellaneous Manufacturing
100 plus: 310; 20 plus: 360

North Carolina Dept. of Conservation and Dev., Raleigh, W. P. Saunders, Dir.; **Capital Aera Dev. Assn.,** Raleigh, G. Goeghegan; **Northwest N. C. Dev. Assn.,** Winston Salem, N. Bolton; **Southeastern Area Dev. Assn.,** Tabor City, H. Carter; **Duke Power Co.,** Industrial Power Dept., Charlotte 1, C. B. Brown, Mgr.; **Atlantic Coast Line Rwy.,** Wilmington, R. P. Jobb; **Carolina Power & Light Co.,** Area Dev. Dept., D. E. Stewart, Mgr., Raleigh

North Dakota

Primary Metals
100 plus: 114; 20 plus: 114

Fabricated Metal Products
100 plus: —; 20 plus: 25

Machinery (Except Electrical)
100 plus: —; 20 plus: 153

North Dakota Economic Dev. Comm., Bismarck, L. A. Schneider, Dir.

Ohio

Ordnance & Accessories
100 plus: 651; 20 plus: 651

Metal Furniture
100 plus: 12,625; 20 plus: 14,212

Primary Metals
100 plus: 166,914; 20 plus: 176,733

Fabricated Metal Products
100 plus: 97,028; 20 plus: 122,181

Machinery (Except Electrical)
100 plus: 128,343; 20 plus: 150,905

Electrical Machinery, Equipment
100 plus: 115,267; 20 plus: 120,190

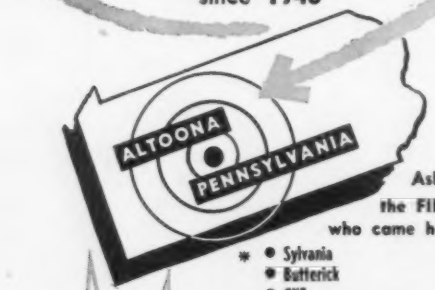
Transportation Equipment
100 plus: 132,445; 20 plus: 136,706

Instruments, etc.
100 plus: 7,677; 20 plus: 8,929

Miscellaneous Manufacturing
100 plus: 8,080; 20 plus: 10,277

Ohio Ind. Dev. Dept., Huntington Bank Bldg., Columbus 15, A. E. Redman, Dir.; **Area Development,** Akron, G. E. Wilson,

A well financed Community
Industrial Development Program
in Altoona attracted **ELEVEN** * new and nationally known plants since **1946**



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● Butterick
● SKF
● National—U. S. Radiator
● Butcher and Hart of Toledo
● Altoona Shoe
● Sydney Chairs of Detroit
● Stanley Electric of Philadelphia
● Pennsylvania Shoe
● Veeder-Root of Hartford
● Small Tube Products of Waterbury

For further facts write to Altoona Chamber of Commerce, or visit us at the Industrial Exposition, New York Colosseum—April 7-11.

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creates a KETTLE

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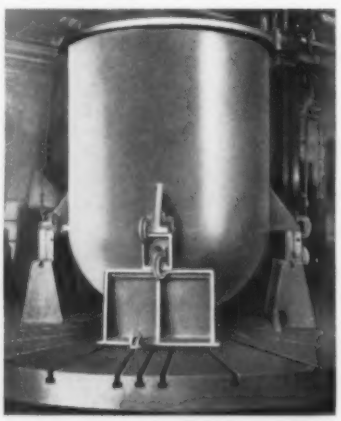
Diameter—6 ft. 5 in.
Height—10 ft. 3 in.
Weight—12,600 lbs.
Tensile Strength
32,800 psi

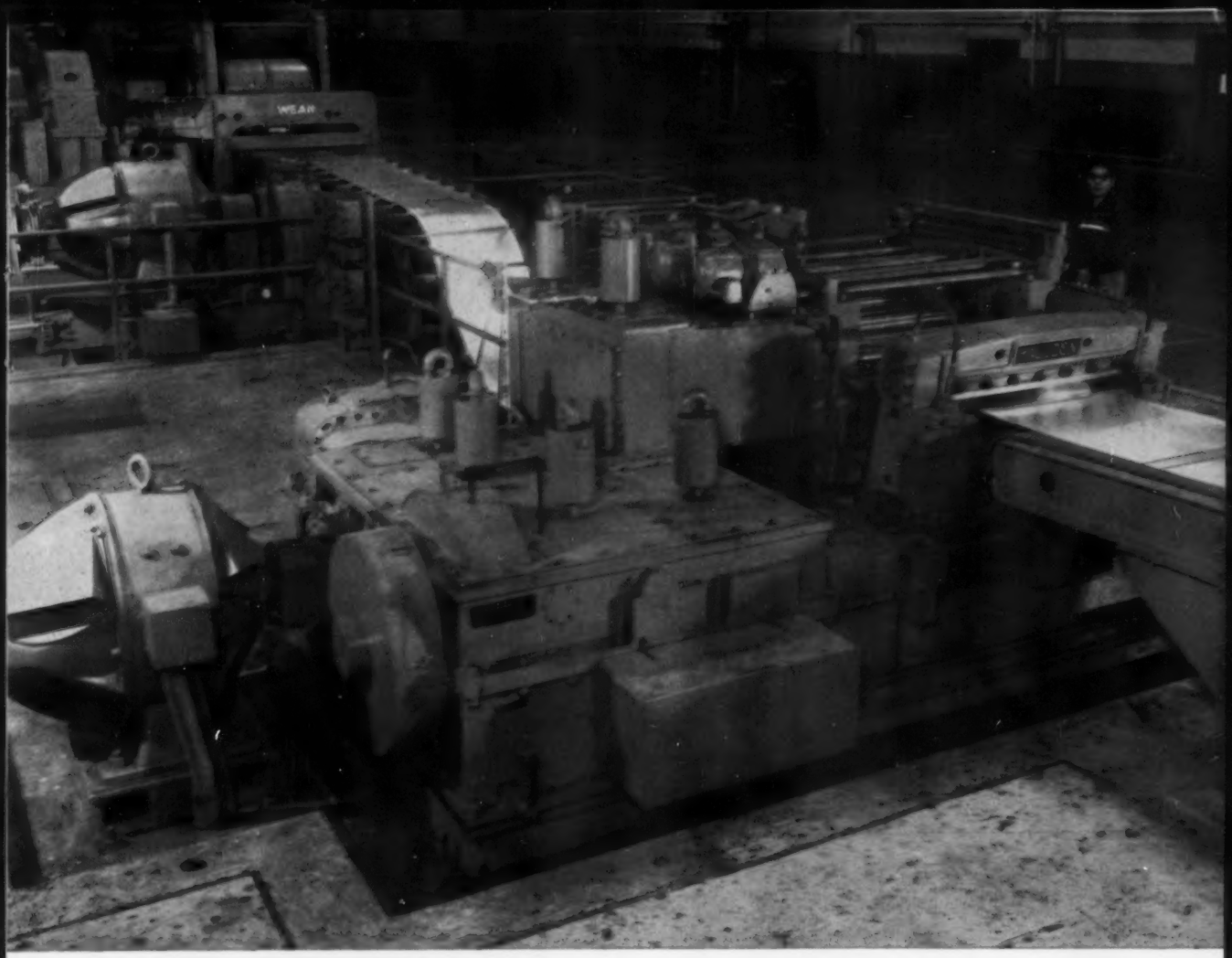


Machining operation shown is being done in our Machine Shop. Cast of Ductile Iron.

Whether the castings you need are classified as usual or unusual, we are anxious to prove to you that Kutztown castings are accurately and economically produced.

We'll be happy to place your name on our mailing list to receive regular issues of the "Kutztown REVIEW."

KUTZTOWN FOUNDRY & MACHINE CORP.
KUTZTOWN, PENNSYLVANIA



Precision Shearing at High Speeds... Creative Engineering at Work

As the art of steel making progressed, the continuous high speed line process of manufacturing became an integral part of modern steel production. This advancement in technique brought about the development of precision components that could produce quality at high speeds. The Hallden Shear, designed to shear strip and sheet, is such a tool. The Hallden Flying Shear has been incorporated into 28 coil galvanizing lines, and the Hallden Rotary Tin Plate Shear is operating in 76 black plate or tin plate lines.
The Hallden Shear, engineered into a great many of Wean's continuous high speed lines, is furnished to the steel industry by The Wean Engineering Company Inc., Warren, Ohio.

THE WEAN ENGINEERING COMPANY INC. • WARREN • OHIO

2259

Exec. Dir.; **Lorain County Dev. Comm.**, Lorain, R. H. Spaethe; **Upper Ohio Valley Dev. Council**, Steubenville, W. L. Myers, Jr., Exec. Mgr.; **Toledo Ind. Dev. Council**, Toledo, H. A. Flick, Exec. Sec'y.; **Stark County Ind. Dev. Corp.**, Canton, W. Belden, Pres.; **Greater Youngstown Area Foundation**, Youngstown, C. F. Gangloff, Exec. Sec'y.; **Toledo-Lucas County Port Authority**, Toledo, W. C. Beckett, Mgr. of Statistics; **Ohio Valley Improvement Assn.**, Cincinnati, H. M. Mack, Pres.

Oklahoma

Metal Furniture
100 plus: —; 20 plus: 80

Primary Metals
100 plus: 2,789; 20 plus: 3,286

Fabricated Metal Products
100 plus: 4,999; 20 plus: 6,641

Machinery (Except Electrical)
100 plus: 4,849; 20 plus: 6,812

Electrical Machinery, Equipment
100 plus: 1,245; 20 plus: 1,344

Transportation Equipment
100 plus: 16,383; 20 plus: 16,675

Instruments, etc.
100 plus: 208; 20 plus: 555

Miscellaneous Manufacturing
100 plus: 400; 20 plus: 447

Oklahoma Dept. of Commerce & Industry, Oklahoma Farm Bldg., Oklahoma City, R. T. Klemme, Dir.

Oregon

Ordnance & Accessories
100 plus: 400; 20 plus: 400

Metal Furniture
100 plus: —; 20 plus: 135

Primary Metals
100 plus: 2,732; 20 plus: 3,531

Fabricated Metal Products
100 plus: 2,159; 20 plus: 3,948

Machinery (Except Electrical)
100 plus: 2,688; 20 plus: 4,038

Electrical Machinery, Equipment
100 plus: 1,630; 20 plus: 1,802

Transportation Equipment
100 plus: 1,531; 20 plus: 1,951

Instruments, etc.
100 plus: 238; 20 plus: 324

Miscellaneous Manufacturing
100 plus: —; 20 plus: 162

Oregon Dept. of Planning and Dev., State Office Bldg., Portland, J. R. Jensen, Exec. Dir.; **Spokane, Portland & Seattle R. R.**, American Bank Bldg., Portland, R. A. Lawrence; **Portland Railway & Terminal Div.**, Water St., Portland, F. V. Schlas; **Mid-Willamette Valley Panning Council**, Salem; **Albany Industrial Committee**, Albany; **Central Lane County Planning Comm.**, Eugene; **Bonneville Power Admin.**, Lloyd Blvd., Portland, W. A. Pearl; **California Oregon Power Co.**, W. Main St., Medford; **Pacific Power and Light Co.**, Public Service Bldg., Portland; **Portland Gas & Coke Co.**, Public Service Bldg., Portland.

Pennsylvania

Ordnance & Accessories
100 plus: 7,203; 20 plus: 7,203

Metal Furniture
100 plus: 5,560; 20 plus: 7,504

Primary Metals
100 plus: 248,206; 20 plus: 256,257

Fabricated Metal Products
100 plus: 89,498; 20 plus: 111,368

Machinery (Except Electrical)
100 plus: 81,186; 20 plus: 97,102

Electrical Machinery, Equipment
100 plus: 85,633; 20 plus: 89,593

Transportation Equipment
100 plus: 58,063; 20 plus: 59,907

Instruments, etc.
100 plus: 16,404; 20 plus: 17,950

Miscellaneous Manufacturing
100 plus: 9,943; 20 plus: 11,721

Pennsylvania Ind. Dev. Authority, Main Capitol Bldg., Harrisburg, J. T. Gross, Exec. Dir.; **Greater Berks Dev. Fund**, Reading, F. H. Mills, Pres.; **Butler County Dev. Corp.**, Butler, I. E. Keck, Pres.; **Greater Erie Ind. Dev. Corp.**, Evans Rd., Erie, O. H. Marshall, Chmn.; **Fayette County Dev. Council**, Uniontown, F. A. Gradler, Exec. Dir.; **Duquesne Light Co.**, 435 Sixth Ave., Pittsburgh 19, F. B. Mahon, Dir., Area Dev. Dept.; **Metropolitan Edison Co.**, Central Div., Reading, E. Ott, Ind. Engr.; **Pennsylvania Electric Co.**, N. W. Div., Erie, R. B. Andrews; **Pennsylvania Power & Light Co.**, Area Dev. Div., Allentown, D. L. Diehl, Mgr.; **Pennsylvania R. R.**, 6 Penn Center Plaza, Philadelphia 4, R. W. Grigg, Gen. Mgr., Ind. Dev.; **Philadelphia Electric Co.**, Ind. & Comm. Dev. Div., 1015 Chestnut St., C. W. Deeg, Mgr.; **The Reading Co.**, Reading Terminal, Philadelphia, F. X. McBrearty, Mgr., Ind. Dev.; **Altoona Enterprises, Inc.**, 1200 Eleventh Ave., Altoona; **Bucks County Ind. Dev. Corp.**, 50 N. Main St., Doylestown, G. R. Exley, Ex. Dir.; **Ind. Dept. Scranton C. of C.**, Scranton.

Rhode Island

Ordnance & Accessories
100 plus: —; 20 plus: 80

Metal Furniture
100 plus: 184; 20 plus: 309

Primary Metals
100 plus: 5,161; 20 plus: 5,803

AREA DIRECTORY

Fabricated Metal Products
100 plus: 4,404; 20 plus: 6,508

Machinery (Except Electrical)
100 plus: 6,480; 20 plus: 8,712

Electrical Machinery, Equipment
100 plus: 2,725; 20 plus: 3,040

Transportation Equipment
100 plus: 471; 20 plus: 808

Instruments, etc.
100 plus: 2,099; 20 plus: 2,501

Miscellaneous Manufacturing
100 plus: 9,875; 20 plus: 16,178

Rhode Island Development Council, State House, Providence, T. A. Monahan, Exec. Dir.

South Carolina

Metal Furniture
100 plus: —; 20 plus: 76

Primary Metals
100 plus: 264; 20 plus: 450

Fabricated Metal Products
100 plus: 594; 20 plus: 1,030

Machinery (Except Electrical)
100 plus: 1,200; 20 plus: 1,956

Electrical Machinery, Equipment
100 plus: 1,036; 20 plus: 1,036

Transportation Equipment
100 plus: 5,831; 20 plus: 5,927

Instruments, etc.
100 plus: —; 20 plus: 53

Miscellaneous Manufacturing
100 plus: 198; 20 plus: 281

South Carolina Dev. Board, Columbia, R. M. Cooper, Dr.; **Charleston Dev. Board,** Box 141, Charleston, W. W. Humphreys; **Spartanburg County Planning & Dev. Comm.,** Spartanburg, T. B. Pearce, Jr.

South Dakota

Fabricated Metal Products
100 plus: —; 20 plus: 143

Machinery (Except Electrical)
100 plus: —; 20 plus: 167

Transportation Equipment
100 plus: —; 20 plus: 89

South Dakota Industrial Dev. Agency, State Office Bldg., Pierre, N. T. Tweet, Dir.; **Montana-Dakota Utilities Co.,** Rapid City, P. Baxter, Div. Mgr.; **Northern Natural Gas Co.,** Omaha 1, J. L. Parmelee, Mgr., **Northwestern Public Service,** Huron, G. R. McArthur, Pres.

Tennessee

Ordnance & Accessories
100 plus: 440; 20 plus: 440

Metal Furniture
100 plus: 1,444; 20 plus: 1,689

Primary Metals
100 plus: 12,578; 20 plus: 13,072

A sign of efficiency

for every type of building

Wherever you see Kinnear Rolling Doors, you can be sure there's a high level of efficiency in handling plant traffic — plus other important advantages.

The coiling upward action of the *Kinnear-originated* interlocking steel-slat door curtain makes all space around the door fully usable all the time.

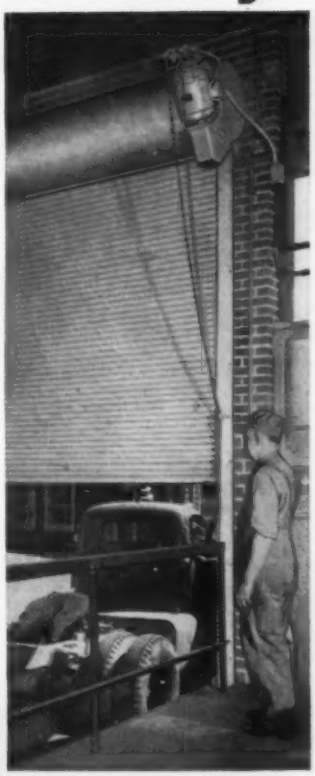
Kinnear Motor Operators add quick, easy, push-button control to this efficiency. They permit you to control any number of doors from a single point, or each door from any number of points.

This cuts traffic delays and bottlenecks and promotes *prompt* door closure, reducing loss of heated air in winter, cooled air in summer.

In addition, Kinnear Rolling Doors assure extra all-steel protection against wind, weather, fire, intrusion and vandalism.

You can't beat Kinnear's 60-year record for providing long, low-cost, dependable door service under hardest daily use. Kinnear Rolling Doors — built to fit any opening — are easily installed in old or new buildings.

Write today for catalog or recommendations.



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ROLLING DOORS
Saving Ways in Doorways

The KINNEAR Mfg. Co.
Offices and Agents in All Principal Cities

Heavily Galvanized! 1.25 oz. of pure zinc per sq. ft. of metal (ASTM Standards) gives Kinnear Rolling Doors **lasting** protection from the elements. Special Kinnear Paint Bond permits paint to be applied immediately after doors are erected, assuring thorough coverage and lasting adhesion.

FACTORIES: 1760-80 Fields Ave., Columbus 16, Ohio; 1742 Yosemite Ave., San Francisco 24, Calif.

MicroRold® STAINLESS SHEET

Type 430 Bright Finish

up to 48" WIDE

BRIGHTER THAN EVER!—MicroRold stainless steel Type 430 in the NEW Bright Finish is now immediately available in sheets up to 48" wide offering new usefulness and economy in stainless fabrication. Produced with the same micro-accuracy of gauge for which MicroRold 36" is well known, Type 430 Bright up to 48" wide gives greater latitude in applications for quality stainless steel.

MicroRold 430 is also available in the regular commercial finishes and MicroRold stainless in other grades are now produced up to 48" wide. Complete details sent on request.

32-L

Washington Steel Corporation
WOODLAND AVENUE WASHINGTON, PA

Fabricated Metal Products
100 plus: 5,916; 20 plus: 8,047

Machinery (Except Electrical)
100 plus: 8,701; 20 plus: 10,644

Electrical Machinery, Equipment
100 plus: 8,521; 20 plus: 8,924

Transportation Equipment
100 plus: 9,148; 20 plus: 9,547

Instruments, etc.
100 plus: 2,055; 20 plus: 2,055

Miscellaneous Manufacturing
100 plus: —; 20 plus: 99

Tennessee Ind. & Agr. Dev. Comm., Nashville, G. I. Whitlatch, Exec. Dir.; **Committee of 100,** Chattanooga Chamber of Comm., Chattanooga, D. B. Williams, Dir.; **Industrial Council, Committee of 100,** Knoxville, W. M. Nash, Secy.; **Memphis Industrial Dev. Comm.,** Box 224, Memphis, J. B. Thurston, Secy.; **Memphis and Shelby County Port Comm.,** Box 3582, Memphis, Col. C. Kittrell, Port Dir.

Texas

Ordnance & Accessories
100 plus: 170; 20 plus: 170

Metal Furniture
100 plus: 1,046; 20 plus: 1,708

Primary Metals
100 plus: 19,838; 20 plus: 21,755

Fabricated Metal Products
100 plus: 17,609; 20 plus: 24,380

Machinery (Except Electrical)
100 plus: 22,307; 20 plus: 28,994

Electrical Machinery, Equipment
100 plus: 4,267; 20 plus: 4,837

Transportation Equipment
100 plus: 44,782; 20 plus: 46,512

Instruments, Photo Equipment, Clocks
100 plus: 795; 20 plus: 1,148

Miscellaneous Manufacturing Industries
100 plus: 306; 20 plus: 461

Port of Corpus Christi, Box 1541, B. Harris, Port Dir.; **Dallas Power & Light Co.,** 1506 Commerce St.; **Lone Star Gas Co.,** 301 S. Harwood St., Dallas, D. A. Hulcy, Pres.; **Texas Power & Light Co.,** Fidelity-Union Life Bldg., Dallas, E. H. McElroy, Jr., Dir. Area Dev.; **Texas & Pacific Rwy.,** Dallas 2, J. A. McCaul, Dir. Ind. Dev.; **Southwest Elec. Service Co.,** Mercantile Bank Bldg., Dallas, C. D. Goforth, Dir. Ind. Dev.

Utah

Primary Metals
100 plus: 10,433; 20 plus: 10,631

Fabricated Metal Products
100 plus: 750; 20 plus: 1,493

Machinery (Except Electrical)
100 plus: 1,440; 20 plus: 1,637

Electrical Machinery, Equipment
100 plus: —; 20 plus: 23

Transportation Equipment
100 plus: —; 20 plus: 80

Miscellaneous Manufacturing
100 plus: —; 20 plus: 151

Utah Committee on Ind. & Employment Planning, Salt Lake City 10, W. C. Palfreyman, Program Dir.; **Utah Power and Light Co.,** Kearns Bldg., Salt Lake City, W. A. Huckins, Ind. Mgr.; **Mountain Fuel Supply Co.,** Salt Lake City, H. Simpson.

Vermont

Primary Metals
100 plus: 780; 20 plus: 909

Fabricated Metal Products
100 plus: 337; 20 plus: 578

Machinery (Except Electrical)
100 plus: 5,809; 20 plus: 6,305

Electrical Machinery, Equipment
100 plus: 513; 20 plus: 513

Transportation Equipment
100 plus: 1,800; 20 plus: 1,800

IF IT'S A RITCO FORGING

Ritco also offers complete machining facilities and makes Special Fasteners and Upsets of ferrous and non-ferrous metals. Send us your requirements.

IT'S A CLEANER PART!

Faster assembly and minimum machining are but two of many savings you make when you specify Ritco "Bright Finish" Forgings.

Made to close tolerances, highly accurate Ritco Forgings have a smooth, flawless finish free of flash, voids or blow holes. They save hours of time and trouble on product finishing and assembly. You'll find, too, that their dense, fibrous structure and controlled grain flow add greater strength and toughness to points of shock . . . assure maximum impact resistance and fatigue strength.

Write Ritco into your product specifications now. Ritco Forgings are produced in a wide range of metals and alloys, and in many designs.

Send us your blueprints now for estimates at no obligation!

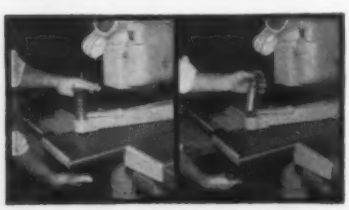
RHODE ISLAND TOOL COMPANY
Member Drop Forging Association
144 WEST RIVER STREET • PROVIDENCE 1, R. I.

THE STRIPPIT FABRICATOR — a single compact multi-purpose Punch Press with quick-change tool holder, quick-set gauging and stops.

Short run? Complicated pattern? If it's sheet metal up to ¼" mild steel, if it's punching, notching or nibbling, it's profitable on a Strippit Fabricator!

Set up in minutes! Punches and dies are changed in 30 seconds or less, and Strippit guided punches need no aligning or adjusting. Back stop with precision gauge is instantly set by a locking knob. Self-tripping finger stops on gauge bars provide multiple stopping as the work is moved rapidly under the punch. A switch gives you single punching or 165-stroke-a-minute nibbling, and all tools are within quick reach in attached "file drawers" or shelves. The Fabricator is more than a one-machine shop — it's a whole system of quick-change, high-profit fabrication used by thousands of shops.

What's more, you can add the Strippit Positive Duplicator for high-speed punching in medium runs — plus the Dupl-O-Scope to punch Duplicator templates right from the drawing, in a few minutes. Write today for details and demonstration at your plant by the Strippit mobile unit. Warehouse stocks in Chicago and Los Angeles.



TOOL HOLDER is pulled out, for instant removal of die and punch assembly, ready for the next interchangeable tool. 1¼" diameter capacity holder shown, 3½" diameter holder also available.

UNIT OF HOUDAILLE INDUSTRIES, INC.

WALES STRIPPIT COMPANY

202 Buell Road, Akron, New York

In Canada: Strippit Tool & Machine Limited, Brampton, Ontario

Instruments, etc.
100 plus: 271; 20 plus: 311

Miscellaneous Manufacturing
100 plus: 210; 20 plus: 260

Vermont Dev. Comm., Montpelier, C. R. Miskelly, Man. Dir.; **Central Vermont Power & Electric Co.**, Rutland.

Virginia

Metal Furniture
100 plus: 734; 20 plus: 964

Primary Metals
100 plus: 4,457; 20 plus: 4,790

Fabricated Metal Products
100 plus: 4,696; 20 plus: 6,707

Machinery (Except Electrical)
100 plus: 2,051; 20 plus: 3,288

Electrical Machinery, Equipment
100 plus: 5,941; 20 plus: 6,183

Transportation Equipment
100 plus: 26,225; 20 plus: 26,779

Instruments, etc.
100 plus: 1,300; 20 plus: 1,379

Miscellaneous Manufacturing
100 plus: 1,163; 20 plus: 1,212

Virginia Dept. of Conservation and Dev., State Office Bldg., Richmond 19, G. R. Long, Act. Comm.; **Virginia Electric & Power Co.**, Richmond, C. Spellman, Dir. of Area Dev.; **Commonwealth Natural Gas Co.**, South Third St., Richmond, H. C. Walton; **Norfolk Southern R.R. Co.**, Norfolk 10, J. M. Dillard; **Norfolk & Western Rwy.**, Roanoke 17, L. E. Ward, Jr.; **Seaboard Airline R.R.**, Norfolk, W. T. White.

Washington

Metal Furniture
100 plus: —; 20 plus: 174

Primary Metals
100 plus: 11,436; 20 plus: 12,380

Fabricated Metal Products
100 plus: 2,220; 20 plus: 4,331

Machinery (Except Electrical)
100 plus: 2,336; 20 plus: 3,883

Electrical Machinery, Equipment
100 plus: 547; 20 plus: 834

Transportation Equipment
100 plus: 48,472; 20 plus: 49,023

Instruments, etc.
100 plus: 265; 20 plus: 318

Miscellaneous Manufacturing
100 plus: —; 20 plus: 134

Washington Dept. of Commerce & Economic Dev., General Admin. Bldg., Olympia, H. D. Kreager, Dir.; **Puget Sound Power & Light Co.**, Stuart Bldg., Seattle; **Spokane, Portland & Seattle R.R.**, American Bank Bldg., Portland; **Seattle Area Ind. Council**, Chamber of Commerce Bldg., Seattle.

West Virginia

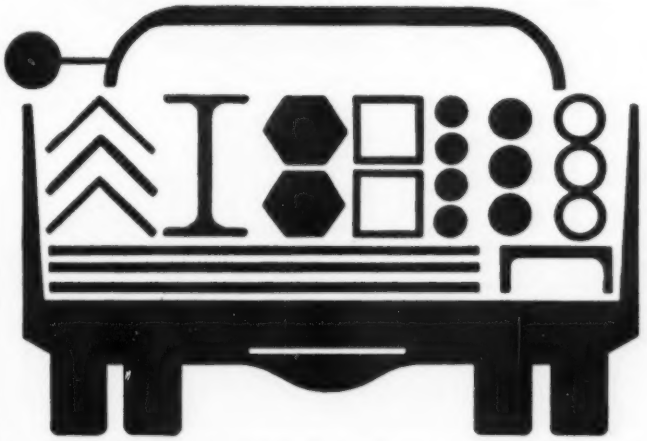
Metal Furniture
100 plus: —; 20 plus: 149

Primary Metals
100 plus: 24,525; 20 plus: 24,942

You can depend on

YOUR STEEL SERVICE CENTER

AMERICAN STEEL



WAREHOUSE ASS'N.

"For want of a bar — a job may be lost"

Forget your worries, and let your local distributor "take over" in keeping your production line supplied with the right steels . . . tailored to your order and timed to your schedules.

This modern steel warehousing service adds to your efficiency and profits. It eases the "pressure" on the busy manufacturer, and pays off on rush orders where a lack of steel might stall an important job.

Your local distributor carries large inventories so you don't have to waste space or tie up capital in surplus stocks. His warehouse is your stockroom with thousands of steel items within phone call.

This friendly, cost-saving service is an asset to your business... use it!

Whenever you need advice on selection of steel grades or methods of fabrication, just call your local distributor. He will be glad to help you.

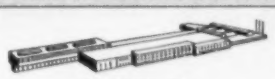
LUSTERIZED FINISH COLD DRAWN BARS

BLISS & LAUGHLIN, INC.

GENERAL OFFICES: HARVEY, ILLINOIS

SALES OFFICES IN ALL PRINCIPAL CITIES

FOUR PLANTS:—



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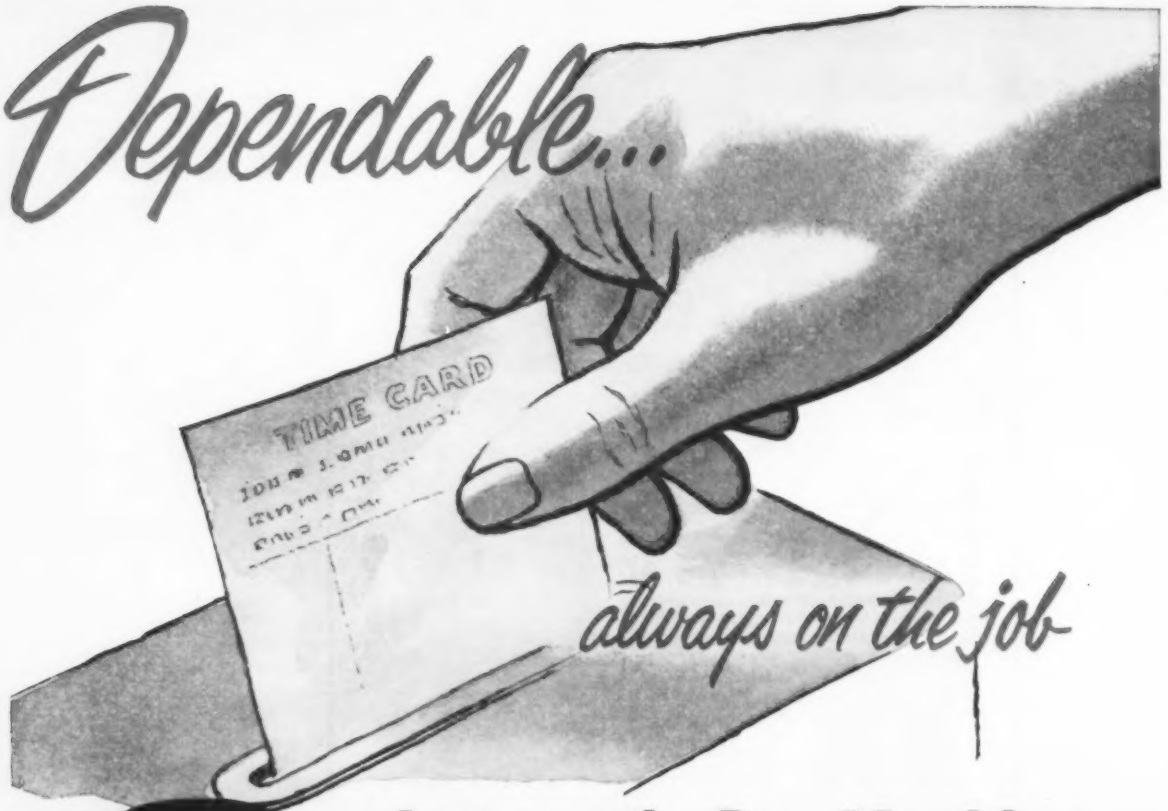
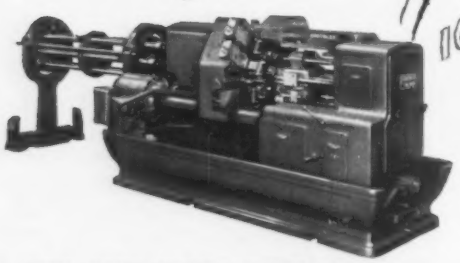
Dependable...



PRODUCTION MACHINERY

GREENLEE Automatic Bar Machines



SIX AND FOUR-SPINDLE AUTOMATIC BAR MACHINES

GREENLEE Special Machine Tools

- Multiple-Spindle Drilling and Tapping Machines
- Transfer-Type Processing Machines
- Hydro-Borer Precision Boring Machines

BOOST PRODUCTION REDUCE DOWN TIME

It's easy to maintain rigid production schedules . . . prevent costly bottlenecks with Greenlee Bar Automatics. They are always on the job . . . give continuous, reliable service.

You hear much comment about Greenlees' uninterrupted, round-the-clock performance in widely different industries. With good reason, too, for Greenlee offers years of manufacturing experience... plus manufacturing integrity not often duplicated.

Want complete information? Call in the Greenlee man. Let him give you the complete story. Please submit a print when inquiring about a specific job.

WRITE FOR CATALOG No. A-405

GREENLEE BROS. & CO.

1803 MASON AVENUE
ROCKFORD, ILLINOIS

Fabricated Metal Products
100 plus: 7,329; 20 plus: 8,316

Machinery (Except Electrical)
100 plus: 2,435; 20 plus: 3,446

Electrical Machinery, Equipment
100 plus: 3,051; 20 plus: 3,266

Transportation Equipment
100 plus: 2,386; 20 plus: 2,431

Instruments, etc.
100 plus: 140; 20 plus: 140

Miscellaneous Manufacturing
100 plus: 900; 20 plus: 900

West Virginia Industrial and Publicity Comm., State Capitol, Charleston, D. E. Crislip, Exec. Dir.; **Little Kanawha Regional Council**, Harrisville, H. E. Moats, Pres.; **Appalachian Electric Power Co.**, Virginia St., Charleston, J. Lloyd.

Wisconsin

Ordnance & Accessories
100 plus: 5,150; 20 plus: 5,150

Metal Furniture
100 plus: 3,185; 20 plus: 3,665

Primary Metals
100 plus: 17,842; 20 plus: 21,038

Fabricated Metal Products
100 plus: 26,704; 20 plus: 33,179

Machinery (Except Electrical)
100 plus: 65,649; 20 plus: 74,044

Electrical Machinery, Equipment
100 plus: 32,406; 20 plus: 34,285

Transportation Equipment
100 plus: 27,196; 20 plus: 28,811

Instruments, etc.
100 plus: 3,830; 20 plus: 4,154

Miscellaneous Manufacturing
100 plus: 1,769; 20 plus: 2,819

Wisconsin Div. of Ind. Dev., Madison, R. L. Koob, Dir.; **Madison Ind. Dev. Corp.**, Madison, H. Behnke, Pres.; **Industries Div., Milwaukee Assn. of Commerce**, Milwaukee, C. G. Crabb, Mgr.; **Madison Gas & Electric Co.**, Madison, J. St. John; **Wisconsin Electric Power Co.**, Milwaukee, E. J. Vanderzee; **Wisconsin Power & Light Co.**, Madison, C. J. Forsberg; **Wisconsin Public Service Corp.**, Milwaukee, H. P. Taylor; **Milwaukee Gas Light Co.**, Milwaukee, E. C. Brenner.

Wyoming

Fabricated Metal Products
100 plus: —; 20 plus: 57

Machinery (Except Electrical)
100 plus: —; 20 plus: 106

Electrical Machinery, Equipment
100 plus: —; 20 plus: 35

Transportation Equipment
100 plus: —; 20 plus: 34

Instruments, etc.
100 plus: —; 20 plus: 55

Wyoming Natural Resource Bd., Supreme Court Bldg., Cheyenne, J. A. Buchanan, Exec. Dir.; **Pacific Light & Power Co.**, Casper, V. Bauer.

Alaska

Alaska Resource Dev. Bd., Federal Bldg., Juneau, A. Anderson, Exec. Dir.; **Anchorage Port · Comm.**, Box 2099, Anchorage, H. Strandberg, Chmn.

Hawaii

Hawaii Economic Planning and Coordination Auth., Honolulu 13, G. Mason, Dir.; Hawaiian Electric Co., Ltd., Industrial Dev. Section, Honolulu, R. C. Bacher.

Puerto Rico

Primary Metals
100 plus: 305; 20 plus: 148

Fabricated Metal Products
100 plus: 404; 20 plus: 216

Machinery (Except Electrical)
100 plus: —; 20 plus: 137

Puerto Rico Economic Dev. Admin., Dept. of Ind. Dev., 579 Fifth Ave., New York 17, H. E. Pineiro, Asst. Dir.; **Government Dev. Bank for Puerto Rico**, Flamingo Bldg., Santurce, Puerto Rico, R. Pico, Pres.; **Puerto Rico Ports Authority**, San Juan, Puerto Rico, E. Gracia, Dir.

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Masland Duran® Clad
VINYL LAMINATED TO METAL

Unlimited design opportunities are opened up by this versatile, semi-rigid vinyl surfacing. Combining practical engineering with high-fashion beauty, it provides a "built-in" finish that remains unimpaired throughout processing operations. Even shearing, crimping, punching or drilling won't damage texture or color. Many distinctive, easy-to-clean colors. For real competitive advantages put Masland Duran Clad in your product design plans.

Industrial Products Division
THE MASLAND DURALEATHER CO.
Dept. IA, Amber and Willard Sts., Philadelphia 34, Pa.

THE MASLAND DURALEATHER CO., Dept. IA
Amber and Willard Sts., Philadelphia 34, Pa.
Please send folder and samples of Masland Duran Clad
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CITY_____ ZONE_____ STATE_____

Masland Duran CLAD vinyl surfacing

No matter what you make from Cold Rolled Steel

An ALAN WOOD Representative can help!

Yes, you can make the all-weather Fishing-Jitney for the fisherman who wants everything. But you had better call your A.W. Representative *before* you start production. Your A.W. Representative may order a special metallurgical study of your problems and bring about savings that build new profits and greater potential. He can provide you with the latest information on cold rolled steel and its application, plus experienced advice on the gauge, size and type to order. Call him today. Your A.W. Representative is always available . . . never out of touch with your location.

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The Iron Age Summary

Steel Orders Bump Along Bottom

Mills console themselves with the thought that things can't get much worse.

Week-to-week order fluctuations reflect uncertainty, low inventories.

■ Steel mills are still bumping along the bottom of the recession trough. As yet there is no sign of even a moderate pickup for the second quarter. Nearly all the news is still bad. Due to the virtual absence of backlogs, production schedules are closely tied to the low incoming order volume.

Most producers are taking unusual steps in an effort to minimize their production costs. Some firms have taken to accumulating orders at various mills and then bunching them as economically as possible on rolling mills. They also are shuttling orders to their most efficient plants, curtailing operations at the least efficient.

Market Uncertain — The week-to-week fluctuation in steel orders reflects the uncertainty and hand-to-mouth inventory policies of steel users. It's just about impossible for the mills to pinpoint even a glimmer of a trend. Some buyers are holding up or canceling out orders that have reached the shipping docks.

Meanwhile, steel salesmen are painting a dismal picture of the automotive order situation. Says one sheet producer: "Steel buyers for the auto industry are still playing Dixie with their orders. The same order will be pushed back two or three times. We seldom know for sure whether delivery ever will be made."

More Work, Fewer Orders — Steel sales offices are working harder than ever, with less to show for their efforts. They are handling as much paper as ever, but tonnage is small. Most office clerical workers are on four-day weeks. Salesmen are making up to 25 pct more calls. Yet early April orders show no significant improvement over March.

One glimmer of hope is that customer inventories are down to bedrock. Missing a delivery by a week causes crises and threats. If business did pick up it would probably snowball because of minimum inventories in the hands of users.

Defense Order Impact—Beefed up defense spending is expected to have some effect by midyear. But as of the moment, it hasn't helped much. Even the much-publicized orders to Chrysler Corp. for military trucks will do little more than pump some confidence into Detroit's bloodstream. Chrysler estimates value of the contracts at between $15 and $20 million, adding that it could not estimate what effect this would have on employment.

Still, the cumulative effect of defense orders is likely to at least play a part in halting the wrong-way trend of orders and production in steel.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,363	1,417	1,475	2,368
Ingot Index				
(1947-1949=100)	84.8	88.2	91.8	147.4
Operating Rates				
Chicago	55.0	55.0*	58.0	87.0
Pittsburgh	56.0	56.5*	58.0	93.0
Philadelphia	57.0	56.0	47.5	105.0
Valley	39.0	41.0*	44.0	88.0
West	63.0	73.5	74.0	102.0
Buffalo	37.0	37.0	39.0	95.0
Cleveland	30.0	31.5*	35.0	94.0
Detroit	28.0	42.0	49.0	99.0
S. Ohio River	54.5	53.5*	52.0	71.0
South	47.5	47.5	51.5	99.0
Upper Ohio R.	74.0	75.0	63.0	78.0
St. Louis	70.0	69.0*	92.0	99.0
Northeast	31.0	31.0	31.0	66.0
Aggregate	....	52.5	54.6	92.5

*Revised

Prices At a Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.967	5.967	5.967	5.670
Pig Iron (Gross ton)	$66.49	$66.49	$66.49	$64.56
Scrap, No. 1 hvy (Gross Ton)	$35.00	$36.33	$37.33	$45.83
No. 2 bundles	$26.17	$27.17	$28.83	$36.83
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	27.10
Copper, electrolytic	25.00	25.00	25.00	32.00
Lead, St. Louis	12.80	12.80	12.80	15.80
Magnesium ingot	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	93.875	94.00*	95.50	102.00
Zinc, E. St. Louis	10.00	10.00	10.00	13.50

Furniture Makers Sell Eye Appeal

Tight competition has made the buyer king in the office furniture market.

Manufacturers feature more color, better styling, and immediate delivery.

▪ With the possible exception of price, the office equipment market has never been more attractive to buyers.

Builders and sellers say the field is more competitive than ever. And business recently has been "indifferent." The result: More attention is being paid to customer opinions.

Promotion Pushed—About two-thirds of the industry have raised prices from 3 to 8 pct in the last year. The remainder are slowly but surely following the trend. One major company has a price hike set for April 1. Manufacturers say increased cost of materials and labor has forced their hand.

To jack up sales the industry is going all out on promotion. Sales forces have been increased and reshuffled. Columbia Steel Equipment Co., subsidiary of Standard Pressed Steel Co., Jenkintown, Pa., has merged its sales force with those of SPS's, Hallowell Div., makers of pressed steel shelving, cabinets and work benches. The reason: Both sales staffs can now offer a more complete line.

Delivery Wins Sales—In the current soft market, one-stop shopping is an important selling point. So is immediate delivery. Wholesalers and distributors are stocking more. In most cases, delivery is right off the shelf. And what the distributor doesn't have, the factory will ship direct to the customer.

Design is playing an increasing part in the market. A prospect can see about as many different, modern-styled desks as the number of makers he checks. Most popular, say producers, are the dogleg, pentagon and oval tops which offer up to 20 pct more work space.

Orders for colors other than standard gray or green have increased by about 25 pct in the last year, says Columbia Steel Equipment. The result: Manufacturers are extending their line of standard colors. CSE, for example, has 12 standard decorator colors, with a possibility of 150 different two-tone combinations.

Modular Construction Gains—Not new, but still on the march, is the trend toward modular construction. Makers say customers don't buy single units, but rather complete work stations. Almost all components of any line of office furniture can be combined in any number of ways. And salesmen are trained as systems analysts as well as journeymen decorators.

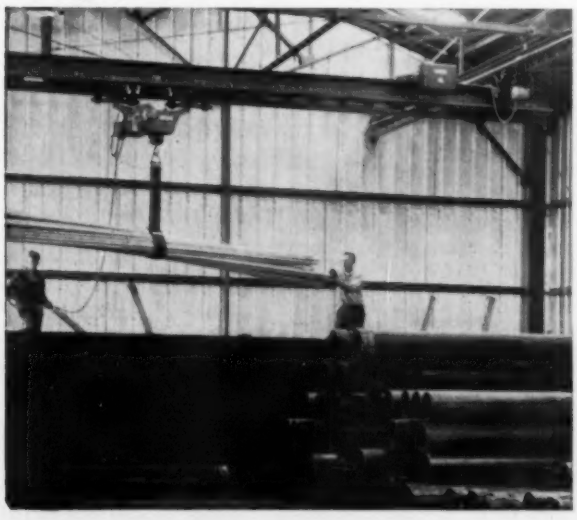
Steel furniture makers are taking the bull by the horns in going after markets formerly considered the private preserve of wood. The main target: executive suites. One major company makes the flat statement, "We can do anything wood can do at about two thirds the cost of wood."

STREAMLINED: Builders are finding that to compete in today's market their line must be attractive as well as efficient. The result has been modern styling, as this unit from Columbia Steel Equipment Co.

Tramrail Crane
CUTS PIPE HANDLING COST 40%

Unloading a railroad car inside the warehouse.

Loading a bundle of pipe directly from railroad car onto a truck for local delivery.



CRANE-O'FALLON CO., Denver, branch of the Crane Co., a large plumbing, heating equipment, valve and fitting manufacturer, installed a Cleveland Tramrail crane for handling pipe out of railroad cars into trucks for immediate delivery or into storage. The crane so speeded the work that now a 100,000 lb. car can be handled for what it formerly cost to unload a 60,000 lb. car.

The crane is of two ton capacity and has a motor-driven bridge and hoist. The carrier is hand-propelled because it rolls free and easy and normally is only traveled a few feet.

The Crane-O'Fallon installation is typical of the great savings that are being made by Cleveland Tramrail cranes and overhead materials handling systems.

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Wire Products Make Sales Gains

Both manufacturers and merchant wire are beginning to show more signs of life.

Industries actively buying include builders, furniture makers, and fastener firms.

▪ Seasonal influences are pumping more life into sales of wire products.

Although still far from healthy, the market is registering some substantial gains. One producer sums it up this way: "March was better for us than February. And right now it looks as though April will top March."

Some mills are more optimistic than others. One spokesman predicts that merchant operations won't average higher than 60 pct of capacity during 1958. Other producers expect a real boom in the fourth quarter which could lift the industry above 1957 tonnage levels.

Buying by several industries is contributing to the improved picture for wire. Construction items are moving well. Furniture and fastener manufacturers are more interested in manufacturers wire.

Import Thorn Remains — Increased ordering of manufacturers wire brought March tonnages in one area up as much as 15 pct higher than those of February. And further gains—estimated from 5 to 20 pct—are forecast for April and May.

However, any advances for wire products must come in the face of stiff foreign competition. There's little enthusiasm, for example, among domestic suppliers of barbed wire and woven wire fence. They look for a deluge of imports in their market this spring. Mills overseas are also shipping in more wire rope, especially in the Southwest.

Delivery Promises at a Glance

	Pittsburgh	Chicago	Cleveland	Detroit	East	West Coast
CR Carbon Sheet	2–4 wks	1–4 wks	2–4 wks	2–4 wks	3–5 wks	4 wks
HR Carbon Sheet	1–2 wks	1–2 wks	1–3 wks	1–3 wks	2–3 wks	3–4 wks
CR Carbon Strip	2–4 wks	1–4 wks	2–4 wks	2–4 wks	3–5 wks	4 wks
HR Carbon Strip	1–2 wks	1–2 wks	1–3 wks	1–3 wks	2–3 wks	3–4 wks
HR Carbon Bars	1–2 wks	1–2 wks	2 wks	1–2 wks	2–4 wks	2–4 wks
CF Carbon Bars	1–4 wks	1–3 wks	1 wk	1–2 wks	1–3 wks	1–2 wks
Heavy Plate	1–4 wks	2–4 wks			3–5 wks	4–6 wks
Light Plate	1–3 wks	1–2 wks	1–3 wks		2–3 wks	4–6 wks
Merchant Wire	1 wk	1 wk	1 wk		Stock	3–4 wks
Oil Country Goods	1–3 wks	1–2 wks	2–3 wks		Stock	
Linepipe	1–8 wks	1–4 wks	3–6 wks		2–4 wks	4–6 wks
Buttweld Pipe	1 wk	1 wk	1 wk	1 wk	Stock	2–4 wks
Std. Structurals	1–4 wks	1–3 wks		1–4 wks	1–6 wks	4–6 wks
CR Stainless Sheet	2–4 wks		1–2 wks	1–2 wks	2–3 wks	
CR Stainless Strip	2–3 wks		1–2 wks	1–2 wks	1–2 wks	

Sheet and Strip—April tonnages, based on orders so far, have only a slim chance of bettering March levels. Detroit mills report April orders from automakers are about the same as those for March. Users other than automotive are still buying only to fill inventories. Included among these are appliance manufacturers, fabricators, farm equipment makers, and warehouses.

Adding to the gloom are indications from some automotive purchasers that they may have placed their last tonnage orders for the 1958 models. If true, this would take them out of the market until about August.

Pittsburgh mills say they are picking up many orders on the basis of rapid delivery.

Bar—"If everyone was ordering like the auto industry," says a **Detroit** producer, "we could close up shop for a few months. And even the industries supporting the market aren't giving us anything to brag about." He added a survey showed only two of seven auto plants felt they would need cold-finished bars for May.

Some automotive bar buyers are re-checking their needs to see if material costs can be reduced by ordering smaller sizes of stock.

Most cold finishers indicate March tonnages are running at about February levels, but some improvement above that may be made.

Structurals—The market is holding relatively firm, stronger at the moment than plate. Mills maintain that supplying a full range of sizes will require a complete rolling cycle of eight weeks. However, deliveries of one week are common even from out-of-the-area mills on a single size.

Pipe — All pipe products are available for prompt delivery. The linepipe picture continues up in the air. Orders stretching four years ahead are still on the books. They haven't been canceled, but producers don't know how firm they really are.

COMPARISON OF PRICES

(Effective March 25, 1958)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	Mar. 25 1958	Mar. 18 1958	Feb. 25 1958	Mar. 26 1957
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.925¢	4.925¢	4.925¢	4.675¢
Cold-rolled sheets	6.05	6.05	6.05	5.75
Galvanized sheets (10 ga.)	6.60	6.60	6.60	6.30
Hot-rolled strip	4.925	4.925	4.925	4.675
Cold-rolled strip	7.17	7.17	7.17	6.870
Plate	5.12	5.12	5.12	4.87
Plates, wrought iron	13.15	13.15	13.15	10.40
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	50.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.30	$10.30	$10.30	$9.95
Tin plates, electro (0.50 lb.)	9.00	9.00	9.00	8.65
Special coated mfg. ternes	9.55	9.55	9.55	9.20
Bars and Shapes: (per pound)				
Merchant bar	5.425¢	5.425¢	5.425¢	5.075¢
Cold finished bars	7.30	7.30	7.30	6.85
Alloy bars	6.475	6.475	6.475	6.125
Structural shapes	5.275	5.275	5.275	5.00
Stainless bars (No. 302)	45.00	45.00	45.00	43.25
Wrought iron bars	14.45	14.45	14.45	11.50
Wire: (per pound)				
Bright wire	7.65¢	7.65¢	7.65¢	7.20¢
Rails: (per 100 lb.)				
Heavy rails	$5.525	$5.525	$5.525	$5.275
Light rails	6.50	6.50	6.50	6.25
Semifinished Steel: (per net ton)				
Rerolling billets	$77.50	$77.50	$77.50	$74.00
Slabs, rerolling	77.50	77.50	77.50	74.00
Forging billets	96.00	96.00	96.00	91.50
Alloy blooms, billets, slabs	114.00	114.00	114.00	107.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.15¢	6.15¢	6.15¢	5.80¢
Skelp	4.875	4.875	4.875	4.225
Finished Steel Composite: (per pound)				
Base price	5.967¢	5.967¢	5.967¢	5.670¢

	March 25 1958	March 18 1958	Feb. 25 1958	March 26 1957
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.97	$70.97	$70.97	$68.88
Foundry, Valley	66.50	66.50	66.50	65.00
Foundry, Southern Cin'ti	73.87	73.87	73.87	67.17
Foundry, Birmingham	62.50	62.50	62.50	59.00
Foundry, Chicago	66.50	66.50	66.50	65.00
Basic, del'd Philadelphia	70.47	70.47	70.47	68.38
Basic, Valley furnace	66.00	66.00	66.00	64.50
Malleable, Chicago	66.50	66.50	66.50	65.00
Malleable, Valley	66.50	66.50	66.50	65.00
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.75
Pig Iron Composite: (per gross ton)				
Pig iron	$66.49	$66.49	$66.49	$64.56
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$34.50*	$36.50	$36.50	$44.50
No. 1 steel, Phila. area	38.00	38.00	38.00	50.50
No. 1 steel, Chicago	*32.50*	34.50	37.50	42.50
No. 1 bundles, Detroit	*27.50*	29.50	29.50	40.50
Low phos., Youngstown	*35.50*	38.50	38.50	45.50
No. 1 mach'y cast, Pittsburgh	51.50	51.50	50.50	50.50
No. 1 mach'y cast, Phila.	49.50	49.50	47.50	55.50
No. 1 mach'y cast, Chicago	48.50	48.50	49.50	47.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	*$35.00*	$36.33	$37.33	$45.83
No. 2 bundles	*26.17*	27.17	28.83	36.83
Coke Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$15.38
Foundry coke, prompt	$17.50-$19	$17.50-$19	17.50-$19	$17.50-$19
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	25.00	25.00	25.00	32.00
Copper, Lake, Conn.	25.00	25.00	25.00	32.00
Tin, Straits, N. Y.	*93.875*†	94.00*	95.50	102.00
Zinc, East St. Louis	10.00	10.00	10.00	13.50
Lead, St. Louis	12.80	12.80	12.80	15.80
Aluminum, virgin ingot	28.10	28.10	28.10	27.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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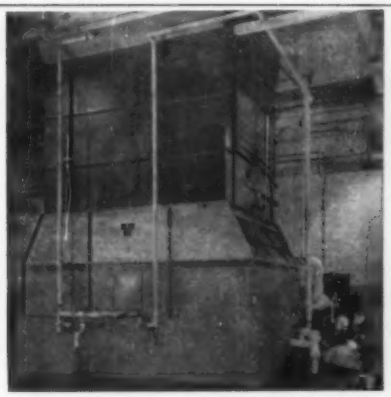

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IRON AND STEEL SCRAP MARKETS

Prices Fall Despite Dealer Resistance

Optimists are falling by the wayside in the current scrap market.

It looks like an upturn may be further away than many dealers had expected.

▪ Scrap prices hit the skids again in most markets.

A determined dealer front to resist lower mill offerings has collapsed. The break was brought on by a number of things.

In Chicago, at least two mills announced they will buy no scrap in April.

Expected mill buying in Detroit never materialized.

Scrap from other districts is moving into Pittsburgh, adding to dealer woes there.

The operating rate in Cleveland has taken another dip.

Exports are dwindling.

Scrap men who were holding out for an upturn now feel that the steel slump has deepened. The oasis which they looked for in May or June has now moved back to midsummer. And they're hoping it isn't a mirage.

The fact that foreign buyers are turning their backs on No. 2 bundles isn't helping the situation in eastern port districts. A year ago export cargoes consisted of about one-third No. 2 bundles. By last month, the proportion dropped to about 25 pct.

Current cargoes are being made up almost entirely of primary steelmaking grades, as foreign mills take advantage of the domestic scrap slump.

The IRON AGE No. 2 Bundles Composite Price fell $1 to $26.17. The No. 1 Heavy Melting Composite Price dropped $1.33 to $35.00.

Pittsburgh — In another sharp break, prices of openhearth grades have tumbled $2 to $3. Turnings, low phos, and No. 1 railroad heavy melting are all down. Mill buying has just about stopped locally and the feeling is growing that tonnage orders won't be placed before midsummer at the earliest. The collapse of the Detroit scrap market has been felt here.

Chicago — The combination of reduced mill quotas, reduced mill offering prices, and announcement by at least two mills of a cutoff in April scrap buying, brought a break in prices of $1 to $2. Scrap movement continues low in volume and dealer stocks are not high. Cast continues to hold strongly.

Philadelphia—Two factors have kept this market from skidding downward: Continuing export orders and proximity to one of the few mills in the U. S. that is operating at near 100 pct capacity. But even export is weakening. No shiploadings are in sight beyond April.

New York—Business here is at a virtual standstill. Brokers insist their next orders to dealers will be at lower prices. As yet, these prices have not materialized. Only price decline is No. 2 bundles which fell $4 to $20-$21.

Detroit — What little dealer optimism that remained in this market has crumbled. Lack of mill support coupled with prospects for more of the same are tending to demoralize the trade. Some dealers say prices will drop below levels of last December.

Cleveland — The market is off slightly on prime grades. The tone is generally weaker as mill operations continue to drag. An early shipment of excess auto tonnage last month brought $34.50 on track —about $2.50 under the original bid for the month.

St. Louis — Mills are buying sparsely and the market continues generally dull. A railroad list of 120 cars brought $1 less for No. 1 railroad heavy melting. Higher prices are being paid for No. 2 bundles, turnings and borings, re-rolling rails.

Birmingham — With practically all orders filled, scrap dealers in this district are searching for more orders at the same prices. But most consumers have dropped out of the market. Brokers expect buying to resume after April 1 at prices $1 to $2 lower. Cast remains firm. Export is practically non-existent.

Cincinnati — Another stalemate is in the wind. Market tone is weaker but dealers are holding out for their price. Late March orders are filling slowly, because dealers are selling only small lots to pay expenses. Shipments of No. 2 bundles and some primary grades are going up-river to Pittsburgh.

Buffalo—A sale of No. 1 cupola cast was made at $43, which is $3 higher than quoted prices. The overall market continues weak, however, with no activity in sight.

Boston—This market is completely dead. There are no signs of life from either domestic or foreign buyers.

West Coast—Very little scrap is in the yards at Los Angeles, San Francisco, and Seattle. Prices remain fairly steady. There are rumors that export might start in May or June. No. 1 cupola cast is the only bright spot.

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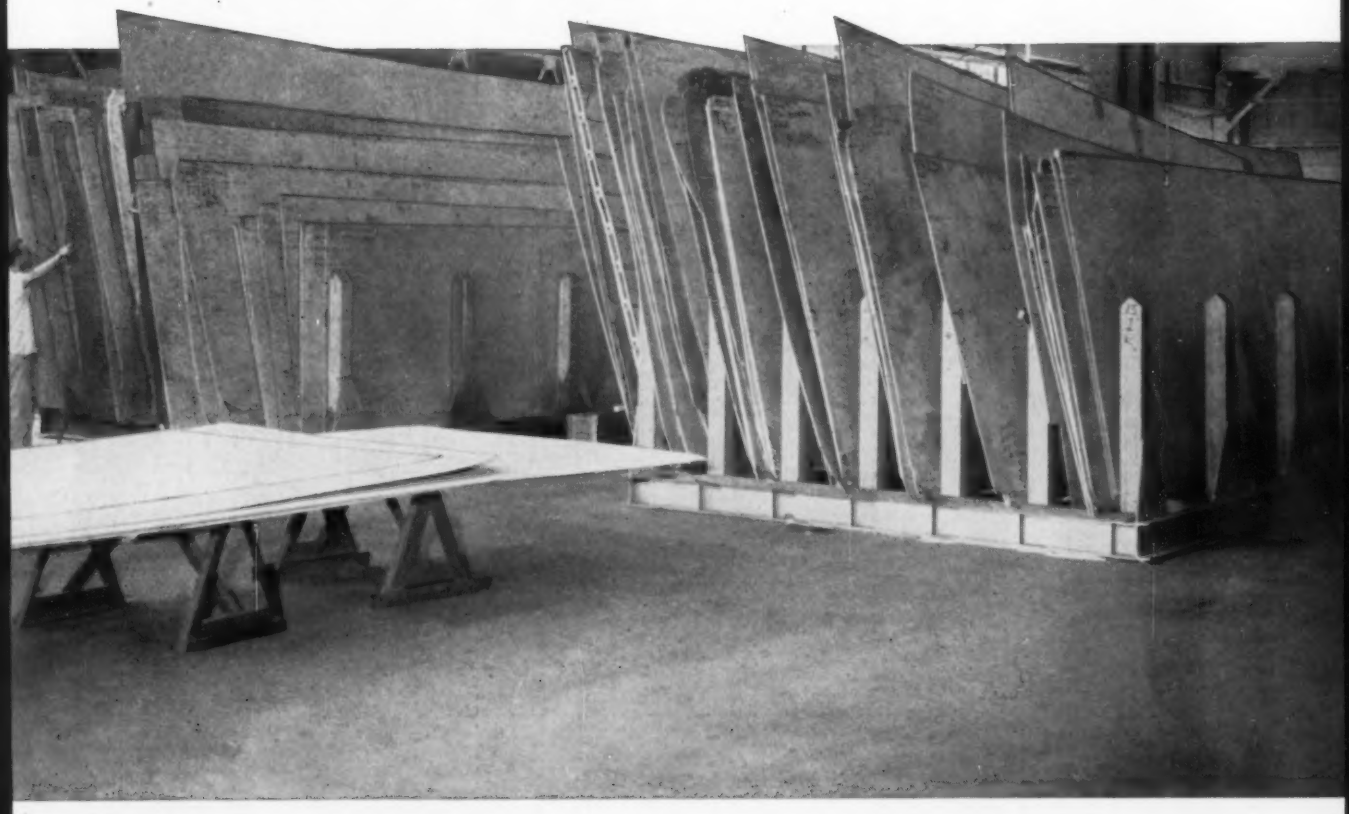

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SCRAP PRICES *(Effective March 25, 1958)*

Pittsburgh

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	34.00 to 35.00
No. 1 factory bundles	38.00 to 39.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and ms. turn.	16.00 to 17.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Low phos. punch'gs plate	38.00 to 39.00
Heavy turnings	30.00 to 31.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	50.00 to 51.00
Rails 2 ft and under	54.00 to 55.00
RR steel wheels	47.00 to 48.00
RR spring steel	47.00 to 48.00
RR couplers and knuckles	47.00 to 48.00
No. 1 machinery cast.	51.00 to 52.00
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	42.00 to 43.00
Stainless	
18-8 bundles and solids	185.00 to 190.00
18-8 turnings	110.00
430 bundles and solids	110.00 to 115.00
410 turnings	60.00

Chicago

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	33.00 to 34.00
No. 1 factory bundles	39.00 to 40.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Low phos. forge crops	48.00 to 49.00
Low phos. punch'gs plate	42.00 to 43.00
Low phos. 3 ft and under	40.00 to 41.00
No. 1 RR hvy. melting	38.00 to 39.00
Scrap rails, random lgth.	48.00 to 49.00
Rerolling rails	55.00 to 56.00
Rails 2 ft and under	54.00 to 55.00
Locomotive tires cut	47.00 to 48.00
Cut bolsters & side frames	44.00 to 45.00
Angles and splice bars	48.00 to 49.00
RR steel car axles	56.00 to 57.00
RR couplers and knuckles	44.00 to 45.00
No. 1 machinery cast	48.00 to 49.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	39.00 to 40.00
Cast iron brake shoe	39.00 to 40.00
Cast iron wheels	36.00 to 37.00
Malleable	52.00 to 53.00
Stove plate	39.00 to 40.00
Steel car wheels	44.00 to 45.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	95.00 to 100.00
430 bundles and solids	100.00 to 110.00
430 turnings	50.00 to 55.00

Philadelphia Area

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	37.50 to 38.50
No. 2 bundles	27.00 to 28.00
No. 1 busheling	37.50 to 38.50
Machine shop turn.	18.00 to 19.00
Mixed bor. short turn.	19.00 to 20.00
Cast iron borings	20.00 to 21.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings	32.00 to 33.00
Low phos. 5 ft and under	42.00 to 43.00
Low phos. 2 ft and under	43.00 to 44.00
Low phos. punch'gs	43.00 to 44.00
Elec. furnace bundles	39.00 to 40.00
Heavy turnings	33.00 to 34.00
RR steel wheels	45.00 to 46.00
RR spring steel	45.00 to 46.00
Rails 18 in. and under	58.00 to 60.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	43.00 to 44.00
Cast iron car wheels	40.00 to 41.00
Malleable	60.00 to 62.00
Unstripped motor blocks	32.00 to 33.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	28.50 to 29.50
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	15.00 to 16.00
Low phos, 18 in. and under	40.00 to 41.00
Rails, random length	44.00 to 45.00
Rails, 18 in. and under	54.00 to 55.00
No. 1 cupola cast.	40.00 to 41.00
Hvy. breakable cast.	33.00 to 34.00
Drop broken cast.	47.00 to 48.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Cleveland

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	31.00 to 32.00
No. 1 factory bundles	34.50 to 35.50
No. 2 bundles	22.00 to 23.00
No. 1 bushelings	31.00 to 32.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Cut struct'r'l & plates, 2 ft & under	40.00 to 41.00
Drop forge flashings	31.00 to 32.00
Low phos. punch'gs plate	33.00 to 34.00
Foundry steel, 2 ft & under	36.00 to 37.00
No. 1 RR heavy melting	39.00 to 40.00
Rails 2 ft and under	54.00 to 55.00
Rails 18 in. and under	55.00 to 56.00
Railroad grate bars	15.00 to 16.00
Steel axle turnings	18.00 to 19.00
Railroad cast.	47.00 to 48.00
No. 1 machinery cast.	46.00 to 47.00
Stove plate	43.00 to 44.00
Malleable	59.00 to 60.00
Stainless	
18-8 bundles	165.00 to 170.00
18-8 turnings	90.00 to 95.00
430 bundles	95.00 to 100.00
430 turnings	40.00 to 45.00

Buffalo

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	25.50 to 26.50
No. 1 busheling	28.00 to 29.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	22.50 to 23.50
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	14.00 to 15.00
Low phos. plate	34.00 to 35.00
Structurals and plate, 2 ft and under	37.00 to 38.00
Scrap rails, random lgth.	40.00 to 41.00
Rails 2 ft and under	50.00 to 51.00
RR steel wheels	37.00 to 38.00
RR spring steel	33.00 to 34.00
RR couplers and knucklers	33.00 to 34.00
No. 1 machinery cast.	46.00 to 47.00
No. 1 cupola cast.	42.00 to 43.00

St. Louis

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	19.00 to 20.00
Cast iron borings	21.00 to 22.00
Shoveling turnings	21.00 to 22.00
No. 1 RR hvy. melting	37.00 to 38.00
Rails, random lengths	48.00 to 49.00
Rails, 18 in. and under	54.00 to 55.00
Angles and splice bars	47.00 to 48.00
Std. steel car axles	52.00 to 53.00
RR specialties	44.00 to 45.00
Cupola cast.	45.00 to 46.00
Heavy breakable cast.	32.00 to 33.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	39.00 to 40.00
Cast iron car wheels	37.00 to 38.00
Rerolling rails	57.00 to 58.00
Unstripped motor blocks	35.00 to 36.00

Birmingham

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	12.00 to 13.00
Electric furnace bundles	37.00 to 38.00
Elec. furnace, 3 ft & under	36.00 to 37.00
Bar crops and plate	39.00 to 40.00
Structural and plate, 2 ft.	39.00 to 40.00
No. 1 RR hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	45.00 to 46.00
Rails, 18 in. and under	49.00 to 50.00
Angles & splice bars	43.00 to 44.00
Rerolling rails	52.00 to 53.00
No. 1 cupola cast.	51.00 to 52.00
Stove plate	49.00 to 50.00
Charging box cast.	22.00 to 23.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	40.00 to 41.00

Youngstown

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. plate	35.00 to 36.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	29.00 to 30.00
No. 2 dealer bundles	20.00 to 21.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	25.00 to 26.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	34.00 to 35.00
Charging box cast.	32.00 to 33.00
Heavy breakable cast.	32.00 to 33.00
Unstripped motor blocks	27.00 to 28.00
Stainless	
18-8 prepared solids	155.00 to 160.00
18-8 turnings	60.00 to 65.00
430 prepared solids	75.00 to 80.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	26.00 to 27.00
Drop forge flashings	24.00 to 25.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	11.00 to 12.00
Cast iron borings	11.00 to 12.00
Low phos. punch'gs plate	26.00 to 27.00
No. 1 cupola cast.	35.00 to 36.00
Heavy breakable cast.	26.00 to 27.00
Stove plate	30.00 to 31.00
Automotive cast.	36.00 to 37.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	26.00 to 27.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	26.00 to 27.00
Elec. furnace, 3 ft & under	31.00 to 32.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and short turn.	9.00 to 10.00
Shoveling turnings	11.00 to 12.00
Clean cast. chem. borings	19.00 to 20.00
No. 1 machinery cast.	34.00 to 35.00
Mixed cupola cast.	30.00 to 31.00
Heavy breakable cast.	29.00 to 30.00
Stove plate	26.00 to 27.00
Unstripped motor blocks	26.00 to 27.00

San Francisco

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	30.00
No. 1 dealer bundles	28.00
No. 2 bundles	22.00
Machine shop turn.	15.00
Cast iron borings	15.00
No. 1 RR hvy. melting	32.00
No. 1 cupola cast.	40.00

Los Angeles

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	32.00
No. 1 dealer bundles	30.00
No. 2 bundles	22.00
Machine shop turn.	$9.00 to 11.00
Shoveling turnings	11.00 to 13.00
Cast iron borings	11.00 to 13.00
Elec. furn. 1 ft and under (foundry)	45.00
No. 1 RR hvy. melting	36.00
No. 1 cupola cast.	41.00 to 43.00

Seattle

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	30.00
No. 2 bundles	24.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	28.00
No. 1 dealer bundles	32.00
No. 2 bundles	25.00
Mixed steel scrap	27.00
Busheling	32.00
Bush., new fact, prep'd	32.00
Bush., new fact, unprep'd	26.00
Machine shop turn.	17.00
Short steel turn.	21.00
Mixed bor. and turn.	17.00
Rails, rerolling	41.00
Cast scrap	$44.00 to 47.00

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Copper Market May Be Firming

Custom smelters up price ½¢ twice in a week, to 24¢ per lb.

Good demand continues at the higher level.

Trade is hoping this means inventory cutting is over.

▪ It's still too early to really tell, but copper producers, particularly Anaconda, may have called the turn.

Custom smelters bumped their price by ½¢ per lb late last week, and again early this week. The reason: Heavy demand at the lower price. Of even more significance is that buying stayed heavy enough to cause the second hike. If anything, buyers were stimulated, say the smelters.

Pressure Off—Only three weeks ago spokesmen for some producers admitted pressure was building for a lower producers' price. A week later Kennecott cut its U. S. output by another 12 pct in an effort to stem the pressure.

Several producers' spokesmen said, privately, they felt they could hold out another month or so. After that, they were hoping for a pickup in consumer demand.

Anaconda Prediction — For the last six months Roy H. Glover, Anaconda chairman, has been pointing out that copper consumption has been higher than buying because of inventory cutting. He predicted buying would improve when this inventory adjusting was completed. In Anaconda's annual report, released March 20, he and Clyde E. Weed, Anaconda president, said, "Indications are that this inventory adjustment period in copper and copper products has about run its course."

The firming has not reached producers' copper or brass mills. But, trade observers say this is not significant yet. There just hasn't been time.

Other Prices Firm — Another reason for the cautious optimism, starting to show through, is the firmness of other copper prices. The London Metals Exchange copper price firmed noticeably. Both French and Belgium suppliers raised their prices. And the last purchase by a U. S. Mint, at Denver, was at only .56¢ per lb below the current custom smelter price. The mint usually gets a significant reduction in a soft market.

More cautious sellers counsel this strength may be merely a flash in the pan, and not significant of real improvement in the market. But the fact remains there is more optimism and feeling that the copper price has hit bottom, than for some time.

Washington

With most markets, other than copper, showing little change, the nonferrous spotlight is on Washington. Politicians, with an eye on labor conditions in their home states and some upcoming elections; and industry representatives jockeying for position on proposed legislation, are making most of the news. Here's the picture.

Stockpile Proposal—Senator Michael J. Mansfield (D., Mont.), proposed a stockpile purchase program for copper, lead and zinc metals, and manganese ore. He wants the government to buy 400,000 tons of copper at 30¢ per lb, 180,000 tons of lead at 17¢ per lb, 280,000 tons of zinc at 14½¢ per lb.

Enough Lead, Zinc — Gordon Gray, director, Office of Defense Mobilization, said the stockpile of zinc and lead was just about full, and that no government purchases are planned in the fiscal year beginning July 1. Both markets softened at this news, despite the fact that it was expected. But with a little more lead than zinc still needed, lead maintained some degree of strength.

Cut Purchases — The House Committee on Appropriations knocked off a General Services Administration request for $70 million for the purchase of strategic materials in the next fiscal year. The group did not vote any funds to reimburse Commodity Credit Corp. for materials obtained for the supplemental stockpile.

This move does not spell the end of stockpiling since $76 million will be available.

Tin prices for the week: March 19 — 93.50; March 20 — 93.625; March 21—94.00; March 24—93.75; March 25—93.875.*
*Estimate

Primary Prices

cents per lb)	Current price	last price	date of change
Aluminum pig	26.00	25.00	8/1/57
Aluminum ingot	28.10	27.10	8/1/57
Copper (E)	25.00	27.60	1/13/58
Copper (CS)	24.00	23.50	3/24/58
Copper (L)	25.00	27.00	1/13/58
Lead, St. L.	12.80	13.30	12/2/57
Lead, N. Y.	13.00	13.50	12/2/57
Magnesium ingot	36.00	34.09	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	84.50	12/6/56
Titanium sponge	200-250	165-250	1/29/58
Zinc, E. St. L.	10.00	10.50	7/1/57
Zinc, N. Y.	10.50	11.00	7/1/57

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see above; other primary prices, pg. 172.

Do your machines have a Built-in Future?

When you buy new hobbing machines, gear your thinking to the future.

It is not enough just to meet today's production requirements. The machines you buy now must have "built-in" features that will measure up to the high-speed production demands of tomorrow.

The Lees-Bradner Company manufactures a complete line of hobbing machines designed to fulfill varied requirements.

For example, this 7-HD Hevi-Duty Single Spindle Hobbing Machine is built to hob *today* at *tomorrow's* higher feeds and speeds. It's a heavy, powerful machine equipped with a new hob head featuring an axial shift of 3½ inches.

The 7-HD is also available in 4 and 6-spindle rotary models.

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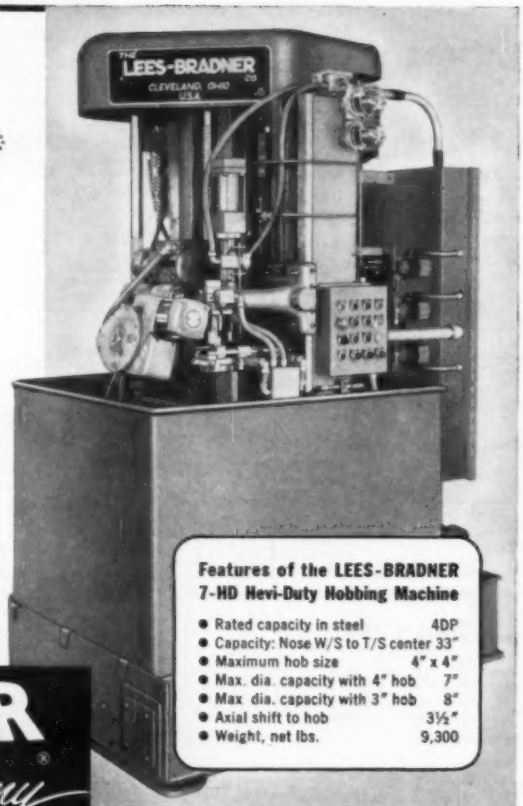

Features of the LEES-BRADNER 7-HD Hevi-Duty Hobbing Machine

Rated capacity in steel	4DP
Capacity: Nose W/S to T/S center	33"
Maximum hob size	4" x 4"
Max. dia. capacity with 4" hob	7"
Max. dia. capacity with 3" hob	8"
Axial shift to hob	3½"
Weight, net lbs.	9,300

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NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3.
1100, 3003	46.6	44.3	43.6	42.7
5052	54.0	48.9	47.2	45.4
6061-0	51.4	47.0	45.2	45.1

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8	45.0-46.8	60.4-64.1
12-14	45.7-47.2	61.3-65.8
24-26	49.0-49.5	72.1-76.8
36-38	58.0-58.6	96.2-99.8

Screw Machine Stock—2011-T-3

Size"	¼	⅛-⅝	¾-1	1¼-1½
Price	63.0	62.5	61.0	58.6

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.420	$1.893	$2.367	$2.839
.024 gage	1.774	2.366	2.957	3.549

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade		67.9	69.0	77.9	108.1
AZ31B Spec.		93.3	95.7	103.7	171.3
Tread Plate		70.6	71.7		
Tooling Plate	73.0				

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90 6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	128
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	300
Shot, blocks		87	

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	48.13		45.36	48.32
Brass, 70/30	42.69	43.23	42.63	45.60
Brass, Low	44.90	45.44	44.84	47.71
Brass, R L	45.67	46.21	45.61	48.48
Brass, Naval	47.07		41.38	50.48
Munts Metal	45.19		41.00	
Comm. Ba.	45.98	47.52	46.92	49.54
Mang. Ba.	50.81		44.91	
Phos. Ba. 5%	67.17		67.67	

Free Cutting Brass Rod 31.03

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $9.50-$10.60; alloy, $14.75; Plate, HR, commercially pure, $8.00-$8.75; alloy, $10.75. Wire, rolled and/or drawn, commercially pure, $7.50-$8.00; alloy, $10.00, Bar, HR or forged, commercially pure, $6.15-$6.40; alloy, $6.15-$6.35; billets, HR, commercially pure, $6.00-$6.25; alloy, $6.00-$6.20.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.55
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic basis ... $ 1.31
Cobalt, 97-99% (per lb) ..$2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 39.50 to 50.00
Gold, U. S. Treas, per troy oz. $35.00
Indium, 99.9%, dollars per troy oz..$ 2.25
Iridium, dollars per troy oz. ...$80 to $90
Lithium, 98% .....$11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York .....$233 to $237
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz...$19 to $21
Platinum, dollars per troy oz...$72 to $75
Rhodium .....$120.00 to $125.00
Silver ingots (¢ per troy oz.)..... 88.625
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 25.25
No. 120 ..... 24.25
No. 123 ..... 23.50
80-10-10 ingot
No. 305 ..... 29.25
No. 315 ..... 27.25
88-10-2 ingot
No. 210 ..... 36.25
No. 215 ..... 32.00
No. 245 ..... 28.75
Yellow ingot
No. 405 ..... 21.25
Manganese bronze
No. 421 ..... 23.00

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.75-25.75
0.60 copper max. 24.50-25.50
Piston alloys (No. 122 type)..23.75-24.50
No. 12 alum. (No. 2 grade) ...21.00-21.75
108 alloy 21.25-22.25
195 alloy 24.00-25.50
13 alloy (0.60 copper max.) ..24.50-25.50
AXS-679 .....21.25-22.25

(Effective March 24, 1958)

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 22.00-23.00
Grade 2—92-95% 21.00-21.75
Grade 3—90-92% 20.00-20.75
Grade 4—85-90% 17.50-18.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	21	20¼
Yellow brass	16⅛	14⅞
Red brass	18⅜	17⅞
Comm. bronze	19¼	18½
Mang. bronze	14⅞	14⅛
Yellow brass rod ends	15⅞	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 19½
No. 2 copper wire 18
Light copper 15¾
*Refinery brass 17½
Copper bearing material 16¾
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 19⅛
No. 2 copper wire 18
Light copper 15¾
No. 1 composition 17¾
No. 1 comp. turnings 17¼
Hvy. yellow brass solids 13
Brass pipe 15
Radiators 14¼
Aluminum
Mixed old cast. ..... 12½—13½
Mixed new clips ..... 14½—15½
Mixed turnings, dry ..... 13 —14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 17¼—17¾
No. 2 copper wire ..... 15¼—15¾
Light copper ..... 13¼—13¾
Auto radiators (unsweated).. 11 —11½
No. 1 composition ..... 14½—15
No. 1 composition turnings.. 13½—14
Cocks and faucets ..... 12 —12½
Clean heavy yellow brass ... 10 —10½
Brass pipe ..... 12 —12½
New soft brass clippings .... 13 —13½
No. 1 brass rod turnings .... 10½—11

Aluminum

Alum. pistons and struts .... 5½— 6
Aluminum crankcases ..... 10 —10½
1100 (2S) aluminum clippings 13 —13½
Old sheet and utensils ..... 10 —10½
Borings and turnings ..... 6½— 7
Industrial castings ..... 10 —10½
2024 (24S) clippings ..... 11½—12

Zinc

New zinc clippings ..... 4 — 4½
Old zinc ..... 3 — 3¼
Zinc routings ..... 1¾— 2
Old die cast scrap ..... 1½— 1¾

Nickel and Monel

Pure nickel clippings 42-45
Clean nickel turnings 37-40
Nickel anodes 42-45
Nickel rod ends 42-45
New Monel clippings 28-29
Clean Monel turnings 20-22
Old sheet Monel 25-26
Nickel silver clippings, mixed. 18
Nickel silver turnings, mixed. 15

Lead

Soft scrap lead ..... 8½— 9
Battery plates (dry) ..... 3½— 3¾
Batteries, acid free ..... 2½— 2¾

Miscellaneous

Block tin ..... 75 —76
No. 1 pewter ..... 59 —60
Auto babbitt ..... 39 —40
Mixed common babbitt ..... 11 —11½
Solder joints ..... 14½—15
Siphon tops 42
Small foundry type ..... 12 —12¼
Monotype ..... 12 —12¼
Lino. and stereotype ..... 11 —11¼
Electrotype ..... 10 —10¼
Hand picked type shells .... 7 — 7½
Lino. and stereo. dross ..... 3 — 3½
Electro dross ..... 2½— 2¾

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$114.00 *B3*		5.325 *B3*	7.80 *B3*	5.325 *B3*						
	Buffalo, N. Y.	$77.50 *R3, B3*	$96.00 *R3, B3*	$114.00 *R3, B3*	6.225 *B3*	5.325 *B3*	7.80 *B3*	5.325 *B3*	4.925 *R3, B3*	7.15 *S10*	7.325 *B3*			
	Phila., Pa.									7.70 *P15*				
	Harrison, N. J.													15.05 *C11*
	Conshohocken, Pa.		$101.00 *A2*	$121.00 *A2*					4.975 *A2*	7.20 *A2*	7.325 *A2*			
	New Bedford, Mass.									7.60 *R6*				
	Johnstown, Pa.	$77.50 *B3*	$96.00 *B3*	$114.00 *B3*		5.325 *B3*	7.80 *B3*							
	Boston, Mass.									7.70 *T8*				15.40 *T8*
	New Haven, Conn.									7.60 *D1*				
	Baltimore, Md.									7.15 *T8*				
	Phoenixville, Pa.					5.325 *P2*		5.325 *P2*						
	Sparrows Pt., Md.								4.925 *B3*		7.325 *B3*			
	Bridgeport, Wallingford, Conn.			$114.00 *N8*						7.60 *W1*				
	Pawtucket, R. I. Worcester, Mass.									7.70 *N7* 7.70 *A5*				15.40 *N7* 15.20 *T8*
MIDDLE WEST	Alton, Ill.								5.125 *L1*					
	Ashland, Ky.								4.925 *A7*					
	Canton-Massillon, Dover, Ohio		$96.00 *R3*	$114.00 *R3, T5*						7.15 *G4*		10.45 *G4*		14.85 *C11*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$77.50 *U1, R3*	$96.00 *U1, R3,W8*	$114.00 *U1, R3,W8*	6.225 *U1*	5.275 *U1, W8,P13*	7.75 *U1,Y1 W8*	5.275 *U1*	4.925 *W8, N4,A1*	7.25 *A1,T8 M8*			8.10 *W8, S9,I3*	15.05 *A1, S9,G4*
	Cleveland, Ohio									7.15 *A5,J3*		10.45 *A5*	8.10 *J3*	
	Detroit, Mich.			$114.00 *R5*					5.025 *G3, M2*	7.25 *M2,D1, D2,G3,P11*	7.425 *G3*	10.60 *D2* 10.55 *G3*	8.10 *G3*	
	Anderson, Ind.									7.15 *G4*				
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$77.50 *U1*	$96.00 *U1*	$114.00 *U1, Y1*		5.275 *U1, I3*	7.75 *U1, I3*	5.275 *I3*	4.925 *U1, I3,Y1*	7.15 *Y1*	7.325 *U1, I3,Y1*	10.60 *Y1*	8.10 *U1, Y1*	
	Sterling, Ill.	$77.50 *N4*				5.275 *N4*			5.025 *N4*					
	Indianapolis, Ind.									7.30 *J3*				15.20 *J3*
	Newport, Ky.												8.10 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$96.00 *S1, C10*	$114.00 *C10,S1*					4.925 *R3, S1*	7.15 *R3,T4 S1*	7.325 *R3, S1*	10.50 *S1* 10.45 *R3*	8.10 *S1*	15.05 *S1*
	Owensboro, Ky.	$77.50 *G5*	$96.00 *G5*	$114.00 *G5*										
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Aliquippa, Pa.	$77.50 *U1, P6*	$96.00 *U1, C11,P6*	$114.00 *U1, C11,B7*	6.225 *U1*	5.275 *U1, J3*	7.75 *U1, J3*	5.275 *U1*	4.925 *P6*	7.15 *J3,B4, S7*			8.10 *S9*	15.05 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.225 *W3*	5.275 *W3*		5.275 *W3*	4.925 *W3*	7.15 *W3,F3*	7.325 *W3*	10.50 *W3*		
	Youngstown, Ohio	$77.50 *R3*	$96.00 *Y1, C10*	$114.00 *Y1*			7.75 *Y1*			7.15 *Y1,J3*	7.325 *U1, Y1*	10.65 *Y1*	8.10 *U1, Y1*	15.05 *J3* 10.65 *Y1*
WEST	Fontana, Cal.	$88.00 *K1*	$105.50 *K1*	$135.00 *K1*		6.075 *K1*	8.55 *K1*	6.225 *K1*	5.675 *K1*	9.00 *K1*				
	Geneva Utah		$96.00 *C7*			5.275 *C7*	7.75 *C7*							
	Kansas City, Mo.					5.375 *S2*	7.85 *S2*						8.35 *S2*	
	Los Angeles, Torrance, Cal.		$105.50 *B2*	$134.00 *B2*		5.975 *C7, B2*	8.45 *B2*		5.675 *C7, B2*	9.05 *J3* 9.20 *C1*			9.30 *B2*	17.25 *J3*
	Minnequa, Colo.					5.575 *C6*			6.025 *C6*	9.10 *K1*				
	Portland, Ore.					6.025 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$105.50 *B2*			5.925 *B2*	8.40 *B2*		5.675 *C7, B2*					
	Seattle, Wash.		$109.50 *B2*			6.025 *B2*	8.50 *B2*		5.925 *B2*					
SOUTH	Atlanta, Ga.					5.475 *A8*			4.925 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$77.50 *T2*	$96.00 *T2*			5.275 *T2, R4,C16*	7.75 *T2*		4.925 *T2, R3,C16*		7.325 *T2*			
	Houston, Lone Star, Texas		$101.00 *S2*	$119.00 *S2*		5.375 *S2*	7.85 *S2*						8.35 *S2*	

(Effective March 24, 1958)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.			Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.925 *B3*	6.05 *B3*				7.275 *B3*	8.975 *B3*			6.15 *W6*			
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.975 *A2*	6.10 *A2*				7.325 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										6.15 *B3*			
	Fairless, Pa.	4.975 *U1*	6.10 *U1*				7.325 *U1*	9.025 *U1*				$10.15 *U1*	$8.85 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.925 *B3*	6.05 *B3*	6.60 *B3*			7.275 *B3*	8.975 *B3*	9.725 *B3*		6.25 *B3*	$10.15 *B3*	$8.85 *B3*	
	Worcester, Mass.										6.45 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.35 *L1*			
	Ashland, Ky	4.925 *A7*		6.60 *A7*	6.625 *A7*									
	Canton-Massillon, Dover, Ohio			6.60 *R3, R1*										
	Chicago, Joliet, Ill.	4.925 *W8, A1*					7.275 *U1*				6.15 *A5, R3, W8, N4, K2*			
	Sterling, Ill.										6.25 *N4, K2*			
	Cleveland, Ohio	4.925 *R3, J3*	6.05 *R3, J3*		6.625 *R3*		7.275 *R3, J3*	8.975 *R3, J3*			6.15 *A5*			
	Detroit, Mich.	5.025 *G3, M2*	6.15 *G3* 6.05 *M2*				7.375 *G3*	9.075 *G3*						
	Newport, Ky	4.925 *A1*	6.05 *A1*											
	Gary, Ind. Harbor, Indiana	4.925 *U1, I3, Y1*	6.05 *U1, I3, Y1*	6.60 *U1, I3*	6.625 *U1, I3, Y1*	7.00 *U1*	7.275 *U1, Y1, I3*	8.975 *U1, Y1*			6.15 *Y1*	$10.05 *U1, Y1*	$8.75 *I3, U1, Y1*	7.50 *U1, Y1*
	Granite City, Ill.	5.125 *G2*	6.25 *G2*	6.80 *G2*	6.825 *G2*								$8.85 *G2*	7.60 *G2*
	Kokomo, Ind.			6.70 *C9*							6.25 *C9*			
	Mansfield, Ohio		6.05 *E2*			7.00 *E2*								
	Middletown, Ohio		6.05 *A7*	6.60 *A7*	6.625 *A7*	7.00 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.925 *R3, N3, S1*	6.05 *R3*	6.60 *R3*	6.625 *N3, S1*	7.00 *N3, S1, R3*	7.275 *R3*	8.975 *S1, R3*					$8.75 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Donora, Pa. Aliquippa, Pa.	4.925 *U1, J3, P6*	6.05 *U1, J3, P6*	6.60 *U1, J3*	6.625 *U1*		7.275 *U1, J3*	8.975 *U1, J3*	9.725 *U1*		6.15 *A5, J3, P6*	$10.05 *U1, J3*	$8.75 *U1, J3*	7.50 *U1, J3*
	Portsmouth, Ohio	4.925 *P7*	6.05 *P7*								6.15 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.925 *W3, W5*	6.05 *W3, F3, W5*	6.60 *W3, W5*		7.00 *W3, W5*	7.275 *W3*	8.975 *W3*				$10.05 *W5, W3*	$8.75 *W5, W3*	7.50 *W5*
	Youngstown, Ohio	4.925 *U1, Y1*	6.05 *Y1*		6.625 *Y1*		7.275 *Y1*	8.975 *Y1*			6.15 *Y1*			
WEST	Fontana Cal.	5.675 *K1*	7.30 *K1*				8.025 *K1*	10.275 *K1*				$10.80 *K1*	$9.50 *K1*	
	Geneva, Utah	5.025 *C7*												
	Kansas City, Mo.										6.40 *S2*			
	Los Angeles, Torrance, Cal.										6.95 *B2*			
	Minnequa, Colo.										6.40 *C6*			
	San Francisco, Niles, Pittsburgh, Cal.	5.625 *C7*	7.00 *C7*	7.35 *C7*							6.95 *C7*	$10.80 *C7*	$9.50 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.925 *T2, R3*	6.05 *T2, R3*	6.60 *T2, R3*	6.625 *T2*						6.15 *T2, R3*	$10.15 *T2*	$8.85 *T2*	
	Houston, Tex.										6.40 *S2*			

† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box.
* COKES: 1.50-lb. add 25¢.
ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfrs'. Bright
EAST	Bethlehem, Pa.				6.475 *B3*	8.775 *B3*	7.925 *B3*					
	Buffalo, N. Y.	5.425 *R3,B3*	5.425 *R3,B3*	7.35 *B5*	6.475 *B3,R3*	8.775 *B3,B5*	7.925 *B3*	5.10 *B3*		7.20 *B3*		7.65 *W6*
	Claymont, Del.							5.10 *C4*		7.20 *C4*	7.625 *C4*	
	Coatesville, Pa.							5.10 *L4*		7.20 *L4*	7.925 *L4*	
	Conshohocken, Pa.							5.20 *A2*	6.175 *A2*	7.20 *A2*	7.625 *A2*	
	Harrisburg, Pa.							5.10 *P2*	6.275 *P2*			
	Milton, Pa.	5.575 *M7*	5.575 *M7*									
	Hartford, Conn.			7.80 *R3*		9.075 *R3*	7.925 *B3*					
	Johnstown, Pa.	5.425 *B3*	5.425 *B3*		6.475 *B3*			5.10 *B3*		7.20 *B3*	7.625 *B3*	7.65 *B3*
	Fairless, Pa.	5.575 *U1*	5.575 *U1*		6.625 *U1*							
	Newark, N. J. Camden, N. J.			7.75 *W10* 7.75 *P10*		8.95 *W10* 8.95 *P10*						
	Bridgeport, Conn. Putnam, Conn. Willimantic, Conn.			7.85 *W10* 7.80 *J3*	6.55 *N8*	8.925 *N8*						
	Sparrows Pt., Md.		5.425 *B3*					5.10 *B3*		7.20 *B3*	7.625 *B3*	7.75 *B3*
	Palmer, Worcester, Readville, Mass. Mansfield, Mass.			7.85 *B5,C14*		9.075 *A5,B5*						7.95 *A5, W6*
	Spring City, Pa.			7.75 *K4*		8.95 *K4*						
MIDDLE WEST	Alton, Ill.	5.625 *L1*										7.85 *L1*
	Ashland,Newport,Ky.							5.10 *A7;A1*		7.20 *A1*		
	Canton, Massillon, Ohio			7.30 *R3,R2*	6.475 *R3,T5*	8.775 *R3,R2, T5*						
	Chicago, Joliet, Waukegan, Ill. Harvey, Ill.	5.425 *U1,R3, W8,N4,P13*	5.425 *U1,R3, N4,P13*	7.30 *A5, W10,W8 B5,L2,N9*	6.475 *U1,R3, W8*	8.775 *A5, W10,W8 L2,N8,B5*	7.925 *U1,W8*	5.10 *U1,A1, W8,13*	6.175 *U1*	7.20 *U1,W8*	7.625 *U1,W8*	7.65 *A5,R3, W8,N4, K2,W7*
	Cleveland, Ohio Elyria, Ohio	5.425 *R3*	5.425 *R3*	7.30 *A5,C13 C18*		8.775 *A5, C13, C18*	7.925 *R3*	5.20 *R3,J3*	6.175 *J3*		7.625 *R3, J3*	7.65 *A5, C13*
	Detroit, Mich.	5.525 *G3*	5.775 *G3*	7.55 *P3* 7.50 *P8,B5*	6.475 *R5* 6.575 *G3*	8.775 *R5* 8.975 *B5,P3, P8*	8.025 *G3*	5.20 *G3*		7.35 *G3*		
	Duluth, Minn.											7.65 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.425 *U1,I3, Y1*	5.425 *U1,I3, Y1*	7.30 *R3,J3*	6.475 *U1,I3, Y1*	8.775 *R3,M4*	7.925 *U1, Y1*	5.10 *U1,I3, Y1*	6.175 *J3,I3*	7.20 *U1,Y1*	7.625 *U1, Y1,I3*	7.75 *M4*
	Granite City, Ill.							5.30 *G2*				
	Kokomo, Ind		5.525 *C9*									7.75 *C9*
	Sterling, Ill.	5.525 *N4*	5.525 *N4*					5.10 *N4*				7.75 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.30 *C10*	6.475 *C10,S1*	8.775 *C10*	7.925 *S1*	5.10 *R3,S1*		7.20 *S1*	7.625 *R3, S1*	
	Owensboro, Ky.	5.425 *G5*			6.475 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.425 *U1,J3*	5.425 *U1,J3*	7.30 *A5,B4, R3,I3,C11, W10,S9,C8*	6.475 *U1,J3, C11,B7*	8.775 *A5, W10,R3,S9, C11,C8*	7.925 *U1,J3*	5.10 *U1,J3*	6.175 *U1*	7.20 *U1,J3, B7*	7.625 *U1,J3, B7*	7.65 *A5, J3,P6*
	Portsmouth, Ohio											7.65 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.10 *W5*				
	Youngstown, Ohio	5.425 *U1,R3, Y1*	5.425 *U1,R3, Y1*	7.30 *A5,Y1, F2*	6.475 *U1,Y1*	8.775 *Y1,F2*	7.925 *U1,Y1*	5.10 *U1,R3, Y1*		7.20 *Y1*	7.625 *U1, R3,Y1*	7.65 *Y1*
WEST	Emeryville, Cal. Fontana, Cal.	6.175 *J5* 6.125 *K1*	6.175 *J5* 6.125 *K1*		7.525 *K1*		8.625 *K1*	5.90 *K1*		8.00 *K1*	8.425 *K1*	
	Geneva, Utah							5.10 *C7*			7.625 *C7*	
	Kansas City, Mo.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*					7.90 *S2*
	Los Angeles, Torrance, Cal.	6.125 *C7,B2*	6.125 *C7,B2*	8.75 *R3,P14*	7.525 *B2*	10.75 *P14*	8.625 *B2*					8.00 *B2*
	Minnequa, Colo.	5.875 *C6*	5.875 *C6*					5.95 *C6*				7.90 *C6*
	Portland, Ore.	6.175 *O2*	6.175 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.125 *C7* 6.175 *B2*	6.125 *C7* 6.175 *B2*				8.675 *B2*					8.60 *C7,C6*
	Seattle Wash.	6.175 *B2,N6*	6.175 *B2*				8.675 *B2*	6.00 *B2*		8.10 *B2*	8.525 *B2*	
SOUTH	Atlanta, Ga.	5.625 *A8*	5.625 *A8*									7.65 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.425 *T2,R3, C16*	5.425 *T2,R3, C16*	7.90 *C16*			7.925 *T2*	5.10 *T2,R3*			7.625 *T2*	7.65 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*	5.20 *S2* 5.20 *L3*		7.30 *S2*	7.725 *S2*	7.90 *S2*

† Merchant Quality—Special Quality 35¢ higher

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Lackede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 J. & L. Steel Co., Stainless Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Youngstown *R3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fontana *K1*	+8.25	+23.5	+5.25	+19.5	+1.75	+15.00	0.75	+14.25	1.25	+13.25	1.75	+12.75	3.25	+13.00								
Pittsburgh *J3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Alton, Ill. *L1*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Sharon *M3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fairless *N2*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Pittsburgh *N1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Wheeling *W5*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Wheatland *W4*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Youngstown *Y1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Indiana Harbor *Y1*	4.25	+11.0	7.25	+7.0	10.75	+2.50	13.25	+1.75	13.25	+0.75	14.25	+0.25	15.75	+1.00								
Lorain *N2*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Youngstown *R3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Fairless *N2*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Fontana *K1*	+3.75		0.25		3.25		3.75		4.25		4.75		5.25									
Pittsburgh *J3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Alton, Ill. *L1*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Sharon *M3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Pittsburgh *N1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Wheeling *W5*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Wheatland *W4*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Youngstown *Y1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Indiana Harbor *Y1*	8.75	+5.0	12.75	+1.0	15.75	3.50	16.25	2.25	16.75	3.25	17.25	3.75	17.75	2.50								
Lorain *N2*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ⅛, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower d'scounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 10¢ per lb.

(Effective March 24, 1958)

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	49	54	56	57
⅝" thru 1" x longer than 6"	35	40	43	45
Rolled thread carriage bolts ½" & smaller x 6" and shorter	49	54	56	57
Lag, all diam. x 6" & shorter	49	54	56	57
Lag, all diam. longer than 6 in.	39	44½	47	48½
Plow bolts, ½" and smaller x 6" and shorter	49	54	56	57

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	60½
⅞ in. to 1 in. inclusive	55½
1⅛ in. to 1½ in. inclusive	58½
1⅝ in. and larger	53½
C. P. Hex, reg. & hvy.	
¾ in. and smaller	60½
⅞ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	46½
Semi-finished Hex Nuts	
⅝ in. or smaller	60½
¾ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½
(Add 25 pct for broken case or keg quantities)	
Finished	
⅞ in. and smaller	63

Rivets

Base per 100 lb

½ in. and larger $12.25

Pct. Off List

7/16 in. and smaller 19

Cap Screws

	Discount (Packages) *Full Finished H. C. Heat Treat*	
New std. hex head, packaged		
⅝" diam. and smaller x 6" and shorter	40	26
¾", ⅞", and 1" diam. x 6" and shorter	22	3
⅝" diam. and smaller x longer than 6"	8	+13
¾", ⅞", and 1" diam. x longer than 6"	+ 6	+32
	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	58	49
¾" through 1" dia. x 6" and shorter	45	33

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Discount Mach. Screws	Stove Bolts
Cartons	60	60
Bulk *Quantity*		
To ¼" diam. incl. — 25,000-and over	60	..
5/16 to ½" diam. incl. — 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
Quantity		
In Bulk		
¾" diam. & smaller — 25,000 and over	14	16

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.7
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955. value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	40.00
Electrodeposited	31.25
Brass, 80-20, ball anodes, 2000 lb or more	44.00
Zinc, ball anodes, 2000 lb lots	16.50
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carbon, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.55
Tin, ball anodes $1.13 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	68.70
Copper sulphate, 100 lb bags, per cwt.	22.15
Nickel salts, single, 100 lb bags	40.50
Nickel chloride, freight allowed, 300 lb	48.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	24.05
(Philadelphia price 24.50)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 10,000 lb or more	31.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over	10.5¢
F.O.B. Riverton or Camden, New Jersey, freight allowed west of Miss. River	9.5¢
Domestic sponge iron, 98+% Fe, 23,000 lb. and over del'd East of Miss. River	10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River	9.5¢
Canadian sponge iron, del'd in East, carloads	10.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	27.0¢
Carbonyl iron size 3 to 20 micron, 98%, 99.8+% Fe	88.0¢ to $2.85
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	31.1¢ to 47.1¢
Copper, electrolytic	41.50¢
Copper, reduced	40.3¢ to 48.8¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe. 03 max. Del'd	$5.00
Lead	$1.50¢ lb, f.o.b. plant
Manganese f.o.b. Extron, Pa.	46.0¢
Molybdenum, 99%	$3.60 to $3.95
Nickel, chemically precipitated	$1.05
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed ±80	$1.13
Silicon	43.50¢
Solder powder	13¢ plus met. value
Stainless steel, 302	$1.02
Stainless steel, 316	$1.30
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$3.15 (nominal)
Zinc, 5000 lb & over	17.5¢ to 30.7¢

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.64	8.97	9.05	9.01	10.68	.....	.....	.....	.....
Baltimore	$.10	8.38	8.98	9.78	8.86	8.76	9.29	9.16	11.44*	16.18	15.18	19.73	18.98
Birmingham	.15	8.18	9.45	10.15	8.23	8.56	8.64	8.60	10.57	.....	.....	.....	.....
Boston	.10	9.48	10.54	11.55	9.52	9.82	9.73	9.83	13.00	15.79	15.38	19.89	19.18
Buffalo	.15	8.40	9.15	11.22	8.65	9.05	9.05	8.95	11.05*	16.34	15.15	19.01	18.95
Chicago	.15	8.35	9.60	10.25	8.38	8.71	8.79	8.75	8.95	15.80	14.80	19.35	18.60
Cincinnati	.15	8.49	9.65	10.25	8.69	9.08	9.33	9.07	9.46	15.61	15.11	18.96	18.91
Cleveland	.15	8.33	9.60	10.35	8.48	8.94	9.16	8.84	10.95*	15.89	14.89	19.44	18.96
Denver	.20	9.70	11.30	12.49	9.80	9.70	9.80	9.98	10.65	.....	.....	.....	17.60
Detroit	.15	8.58	9.85	10.60	8.73	9.06	9.33	9.05	9.30	15.46	15.06	18.81	18.86
Houston		7.10	8.40	.....	7.25	7.70	7.25	7.20	11.10	16.20	.....	19.30	19.05
Kansas City	.20	9.02	10.27	10.82	9.05	9.38	9.46	9.42	9.87	20.02	15.47	20.02	19.27
Los Angeles	.10	8.60**	10.85	11.75	8.65	8.65	8.70	8.65	13.35*	17.05	16.10	21.05	20.35
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12 11*	.....	.....	.....	.....
Milwaukee	.15	8.48	9.73	10.38	8.51	8.84	9.00	8.88	9.18	15.43	14.93	18.78	18.73
New York	.10	8.97	10.23	10.66	9.41	9.53	9.45	9.67	12.86*	15.82	15.19	18.42	18.99
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.10	9.00	9.97	8.79	8.87	8.60	8.75	11.61*	15.61	15.11	18.96	18.91
Pittsburgh	.15	8.33	9.60	10.60	8.48	8.71	8.79	8.75	10.95*	15.80	14.80	19.35	18.60
Portland		10.00[1]	11.75[2]	13.30[3]	11.95[4]	10.10[5]	11.10[6]	9.85[7]	14.50	18.50	16.10	20.75	20.25
San Francisco	.10	9.45	10.85	11.10	9.55	9.70	9.60	9.80	13.10	17.05	16.10	21.05	20.35
Seattle		9.95	11.15	12.00	10.00	9.70	9.80	10.80	14.05	16.55	16.35	20.65	20.15
Spokane	.15	10.10	11.30	12.15	10.15	9.85	9.95	10.25	14.20	.....	17.35	21.55	21.05
St. Louis	.15	8.69	9.94	10.61	8.74	9.08	9.25	9.12	9.56	15.66	15.16	19.01	18.96
St. Paul	.15	8.94	10.19	10.86	8.99	9.45	9.53	9.37	9.81	.....	15.26	.....	19.06

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **All sizes except 18 and 16 gage. †† 10¢ zinc. ‡ Deduct for country delivery. * C1018—1 in. rounds. (1) 10 ga. x 36" x 120"; (2) 20 ga. x 36" x 120"; (3) 26 ga. x 30" x 96"; (4) ¼" x 1" in lots of 1000 to 9999; (5) sheared plate ¼" x 84" in lots of 1000 to 9999; (6) 2" x 5.70" in lots of 1000 to 9999; (7) M-1020—1-in. rounds in lots of 1000 to 9999.

(Effective March 24, 1958)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.795	T-1
18	4	1	—	5	2.50	T-4
18	4	2	—	—	1.96	T-2
1.5	4	1.5	8	—	1.155	M-1
6	4	3	6	—	1.545	M-3
6	4	2	5	—	1.30	M-2
High-carbon chromium..					.925	D-3, D-5
Oil hardened manganese					.475	O-2
Special carbon					.36	W-1
Extra carbon					.36	W-1
Regular carbon					.305	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4, C4*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	37.95	42.25	46.70	40.00
	316	44.40	49.50	54.50	58.75
	321	40.05	44.60	49.30	47.25
	347	42.40	47.55	52.80	57.00
	405	29.85	33.35	36.85	.....
	410	29.55	33.10	36.70	.....
	430	29.80	33.55	37.25	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 38.75; 1 side, 33.10.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.525	6.50	6.975	.....	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	.....	14.75
So. Chicago *R3*	.....	.....	.....	9.75	.....	.....	.....
Ensley *T2*	5.525	6.50	.....	.....	.....	.....	.....
Fairfield *T2*	.....	6.50	.....	9.75	.....	6.60	.....
Gary *U1*	5.525	.....	.....	.....	.....	6.60	.....
Huntington *C16*	.....	6.50	.....	.....	.....	.....	.....
Ind. Harbor *I3*	5.525	.....	6.975	9.75	.....	6.60	.....
Ind. Harbor *Y1*	.....	.....	.....	9.75	.....	.....	.....
Johnstown *B3*	.....	6.50	.....	.....	.....	.....	.....
Joliet *U1*	.....	.....	6.975	.....	.....	.....	.....
Kansas City *S2*	.....	.....	.....	9.75	.....	.....	14.75
Lackawanna *B3*	5.525	6.50	6.975	.....	.....	6.60	.....
Lebanon *B3*	.....	.....	6.975	.....	14.50	.....	14.75
Minnequa *C6*	5.525	7.00	6.975	9.75	.....	6.60	14.75
Pittsburgh *P5*	.....	.....	.....	.....	.....	.....	14.75
Pittsburgh *J3*	.....	.....	.....	9.75	.....	.....	.....
Seattle *B2*	.....	.....	.....	10.25	.....	6.75	15.75
Steelton *B3*	5.525	.....	6.975	.....	.....	6.60	.....
Struthers *Y1*	.....	.....	.....	9.75	.....	.....	.....
Torrance *C7*	.....	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.50	.....	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	9.75	.....	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$15.00 to $15.75
Foundry, beehive (f.o.b.)	$17.50 to $19.00
Foundry oven coke	
Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Is., Pa.	29.25

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1958 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	.....	9.625	.....
Armature	11.10	10.85	11.35
Elect.	11.80	11.55	12.05
Special Motor	.....	12.10	.....
Motor	12.90	12.65	13.15
Dynamo	13.95	13.70	14.20
Trans. 72	15.00	14.75	15.25
Trans. 65	15.55	Grain Oriented	
Trans. 58	16.05	Trans. 66	20.20
Trans. 52	17.10	Trans. 58	19.20
		Trans. 73	19.70

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*N5*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unbored.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	26.00	40	100, 110	10.70
20	72	25.25	35	110	10.70
18	72	25.75	30	110	10.85
14	72	25.75	24	72 to 84	11.25
12	72	26.25	20	90	11.00
10	60	28.00	17	72	11.40
10	48	28.50	14	72	11.85
7	60	28.25	12	60	12.95
6	60	31.50	10	60	13.00
4	40	35.00	8	60	13.30
3	40	37.00			
2½	30	39.25			
2	24	60.75			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$135.00
No. 1 Ohio	120.00
Sec. Quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$150.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	157.00-160.00
Silica cement, net ton, bulk, Latrobe	28.50
Silica cement, net ton, bulk, Chicago	25.50
Silica cement, net ton, bulk, Ensley, Ala.	26.50
Silica cement, net ton, bulk, Mt. Union	24.50
Silica cement, net ton, bulk, Utah and Calif.	37.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$105.00
Standard chemically bonded, Curtiner, Calif.	115.00
Burned, Balt.	99.00

Magnesite Brick

Standard Baltimore	$131.00
Chemically bonded, Baltimore	116.00

Grain Magnesite

St. ⅝ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Midwest	17.00
Missouri Valley	15.00

(Effective March 24, 1958)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187		212	193	8.65	9.20
Aliquippa *J3****	173	190			190	8.65	9.325
Atlanta *A8***	175	192		214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	8.75	9.425**
Buffalo *W6*	.....	.....	.....	.....	.....	8.65	8.95*
Chicago *N4****	173	190	172	212	190	8.65	9.325
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	8.65	.....
Crawf'dav. *M4***	175	192		214	198	8.75	9.425
Donora, Pa. *A5*	173	187		212	193	8.65	9.20
Duluth *A5*	173	187		212	193	8.65	9.20
Fairfield, Ala. *T2*	173	187		212	193	8.65	9.20
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192		217	198	8.90	9.45
Jacksonville *M4*	184-1	197		219	203	9.00	9.675
Johnstown *B3***	173	190	172		196**	8.65	9.325**
Joliet, Ill. *A5*	173	187		212	193	8.65	9.20
Kokomo *C9**	175	189		214	195*	8.75	9.30*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.60	10.275
Kansas City *S2**.	178	192		217	198*	8.90	9.45*
Minnequa *C6*†	178	192	177	217	198†	8.90	9.45†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.20
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	8.95	9.50*
Pittsburg, Cal. *C7*	192	210			213	9.60	10.15
Rankin, Pa. *A5*	173	187			193	8.65	9.20
So. Chicago *R3*	173	187			193	8.65	9.20
S. San Fran. *C6*†	.....	.....		236	.....	9.60	10.15†
Sparrows Pt. *B3***	175	.....		214	198	8.75	9.425
Sterling, Ill. *N4****	175	192	172	214	198	8.75	9.425
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.30
Worcester *A5*	179	.....	.....	.....	.....	8.95	9.50
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢.
** 11-12¢ zinc.
*** .10¢ zinc.
† Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. *T8*	9.50	10.40	12.60	15.60	18.55
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.25	12.45	15.45	18.40
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *J3*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Pittsburgh *S7*	8.95	10.40	12.60	15.60	18.55
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *J3*	8.95	10.40	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
National Tube	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
Pittsburgh Steel	2	13	36.34	42.56	.....
	2½	12	48.94	57.31	.....
	3	12	56.51	66.18	.....
	3½	11	65.97	77.25	.....
	4	10	87.61	102.59	.....

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	66.50	67.00	67.50	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S1*	66.00	66.50	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	74.00
Youngstown *Y1*	.....	.....	66.50	67.00	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.49 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.00	23.75	23.25	25.25	—	27.00	39.75	32.25	37.00	—	16.75	—	17.00
Slabs, billets	27.00	27.00	28.00	31.50	32.00	33.25	49.50	40.00	46.50	—	21.50	—	21.75
Billets, forging	—	36.50	37.25	38.00	41.00	40.50	62.25	47.00	55.75	32.00	28.25	28.75	28.75
Bars, struct.	42.00	43.00	44.25	45.00	48.00	47.75	73.00	55.50	64.75	37.75	33.75	34.25	34.25
Plates	44.25	45.00	46.25	47.25	50.00	50.75	76.75	59.75	69.75	40.25	35.00	36.75	36.00
Sheets	48.50	49.25	51.25	52.00	—	55.00	80.75	65.50	79.25	48.25	40.25	—	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	—	55.00	80.75	65.50	79.25	48.25	40.25	—	40.75
Wire CF; Rod HR	40.00	40.75	42.00	42.75	45.50	45.25	69.25	52.50 52.75	61.50	35.75	32.00	32.50	32.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2,* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *J3;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1;* New Bedford, Mass. (.25¢ per lb higher), *R6;* Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1,* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5,* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*
Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown; *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R5;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8.*

(Effective March 24, 1958)

don't be a **M.O.O.S.***

Nobody wants to look like this M.O.O.S. He's the man plagued with steel supply problems and the resulting production snarls. But most of all, he's the man who forgot his Steel Warehouse Distributor!

Just around the corner from our M.O.O.S.* (meaning Man Out Of Steel) is the answer to most of his problems. That's where he finds the Steel Distributor with the inventory, equipment and manpower to deliver steel in large and small lots... and do it on short notice, if need be.

Don't be a M.O.O.S., too. Make it a habit to check your Steel Distributor ... first!

- **COLUMBIA STEEL & SHAFTING CO.**
- **SUMMERILL TUBING CO. DIV.**
- **SUMMERILL STAINLESS TUBE DIV.**

PITTSBURGH 30, PA.

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.50
0.025% C (Simplex) 36.75
0.10% C, 52-57% Cr, 2.00% max Si. 37.50
7-8½% max C, 50-55% Cr, 3-6% max Si 22.50
7-8½% max C, 50-55% Cr, 3% max Si 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C $1.31
0.50% max. C 1.31
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.40

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads $1.29
Ton lots 1.31
Less ton lots 1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads	27.50	14.20
Ton lots	32.75	15.65
Less ton lots	34.35	17.30

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads 25.65
Ton lots 27.95
Less ton lots 29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads 24.25
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 17.20
Ton lots 18.70
Less ton lots 19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed 18.50
Ton lots to carload packed 19.65
Less ton lots 20.90

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 14.80
Ton lots packed in bags 17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads 34.00
Ton lots 36.00
250 to 1999 lb 38.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton (Bulk)	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk 12.80
Ton lots, packed 14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet 15.10
Ton lots, packed, pallets 16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe..	24.20	22.90
98% Si, 0.75% Fe	24.95	23.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk 7.70
Ton lots, packed 10.50

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.20	75% Si....	16.40
65% Si....	15.25	85% Si....	18.10
	90% Si....	19.50	

Ferrovanadium

50-55% V delivered, per pound, contained V, carloads, packed.

Openhearth 3.20
Crucible 3.30
High speed steel (Primos) 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
1000 to 9999 lb.	2.40	3.30	4.55

(Effective March 24, 1958)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads ..... 10.65¢
Ton lots ..... 11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.28

Ferrocolumbium, 50-50%, 2 in. x D, delivered per pound contained Cb.

Ton lots $4.25
Less ton lots 4.30

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Sb plus Ta $3.70

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.68

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.41
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium, per lb of alloy

35-40% f.o.b. freight allowed, carloads, packed ..... 27.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B

2000 lb carload $5.50

Bortram, f.o.b. Niagara Falls.

Ton lots per pound ..... 45¢
Less ton lots, per pound ..... 50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.

Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over

No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

GOSS and DE LEEUW

MULTIPLE SPINDLE

CHUCKING MACHINES

Four, Five, Six, Eight Spindles • Work and Tool Rotating Type

GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

READ
THE ADVERTISING PAGES

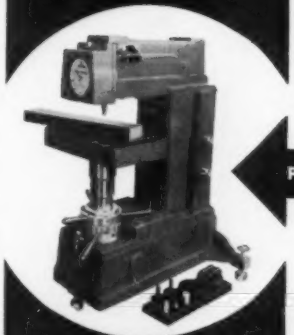
Equipment Materials Services

Sources for every need in the Metalworking Industry.

Use reply postcard on Page 109 to request further information on products advertised in this issue.

The **IRON AGE**

2 Applications (REGULAR AND SUPERFICIAL) 1 Tester



KENTRALL MODEL CT-2

Hundreds of installations over the past few years have proved the economy of the only hardness tester which combines all scales of Rockwell Test (15 to 150 kg. loads).

The Kentrall cuts costs because it does the job of two conventional testers, requires only half the space and maintenance. Write for more detailed information, plus a list of prominent users who have switched to Kentrall.

TB149

PRICE $750.

KENTRALL

THE TORSION BALANCE COMPANY

Main Office and Factory: Clifton, New Jersey

Sales Offices: Chicago, San Francisco

WILLIAMS-WHITE GANTRY PRESS

- Capacity, tons 200
- Table, R-L, F-B ..... 192"x84"
- Travel of Gantry, R-L ..... 144"
- Travel of Bending Ram, F-B ..... 60"
- Daylight ..... 36"; Stroke 24"

A WILLIAMS-WHITE Hydraulic Gantry Press under test prior to shipment to one of the nation's leading manufacturers of air conditioning equipment. Here's one more assurance that you are receiving the best if you specify WILLIAMS - WHITE when purchasing Presses, Bulldozers, Punches, Shears, etc.

Take advantage of the experience accumulated in 104 years of building machinery and discuss your requirements with us before you buy.

REPRESENTATIVES

CALIFORNIA, Los Angeles: George A. Davies Mach'y Co.
MISSOURI, St. Louis or Kansas City: Robt. R. Stephens Mach'y Co.
OHIO, Cincinnati: Columbus or Dayton: Seifreat-Elstad Mach'y Co. Cleveland: A. L. Bechtel & Son
OREGON, Portland: Allied Northwest Mach. Tool Corp.
PENNSYLVANIA, Pittsburgh: Frank Ryman's Sons Wynnewood (Phila.): Edw. A. Lynch Mach'y Co.
WASHINGTON, Seattle: Perine Mach'y & Supply Co.
WISCONSIN, Milwaukee: Pagel Mach'y Co.

BUILDERS OF MACHINERY SINCE 1854

WILLIAMS-WHITE & Co.

302 EIGHTH ST. • MOLINE, ILLINOIS

PRESSES • BULLDOZERS • BENDERS • PUNCHES • SHEARS

"...we are great believers in the consistent

In the Pittsburgh offices of the Rockwell Manufacturing Company, we recently had the pleasant experience of interviewing William F. Weimer, Advertising Manager, on the subject of trade and industrial publications. A resident of the Greater Pittsburgh area since the age of 14, Mr. Weimer joined the Rockwell organization 21 years ago. After considerable experience in both the manufacturing and sales ends of the business he moved into advertising in 1945 and has served in his present capacity for the past 7 years. An active member of several advertising associations, Mr. Weimer is a past president of the Pittsburgh Chapter of NIAA. Here are portions of the interview.

Q Mr. Weimer, how would you describe the Rockwell Manufacturing Company?

A We are a diversified manufacturing organization, and our various divisions and subsidiaries produce a considerable variety of products.

Q Would you name the principal ones?

A Well, first of all we are known to be metering experts and we manufacture meters that measure just about everything from the utilities you buy to the money you spend—gas, water and oil meters; taximeters; fare registers and parking meters, to name a few. In addition we manufacture gas pressure regulators, various types of valves, machine tools, machined parts, and hydraulic drives.

Q How long has your company been in business?

A We have only been operating under the Rockwell name for a little more than 11 years, but when you think in terms of our various subsidiaries and divisions, our history goes back more than 100 years.

Q When did the business as organized today get its start?

A In 1927. In that year Col. Rockwell, for whom our organization is now named, merged the Pittsburgh Meter Company, which made water meters, with the Equitable Meter Company, which made gas meters. From a sales standpoint both organizations were in a seasonal business—opposite seasons—and the merger did much to level out the peaks and valleys in the business cycle. The new company was known as the Pittsburgh Equitable Meter Company. Through the years various subsidiaries were acquired, first to supplement the field of activity served by the original firm and later to expand into diversified markets.

Q When did you acquire your present name?

A In 1949 our name was officially changed to Rockwell Manufacturing Company. This was dictated by the fact that the name Equitable Meter did not convey how broad our scope of activities was, or in the future could be—it fixed our products in the public mind as just meters.

Q How many manufacturing plants do you now have?

A At the present time we have 20, and several more are under construction and near completion.

Q What is your geographical spread?

A Coast to coast.

Q Am I correct in assuming that your advertising history goes back many years?

A Yes. Many of our subsidiaries and divisions have long been aggressive advertisers.

Q And I assume that you stepped up your corporate advertising at the time you took your new name.

A You are right. Of course our first job was to build recognition and prestige for a new name in industry.

Q Is the advertising of all Rockwell divisions handled by your department?

A No. We actually have two advertising operations. In this department we handle all corporate advertising and the product advertising for all units but the Power Tool Division. Because of the nature of the products it manufactures, and because it has an entirely different market, this one division does its own advertising.

Q Do you conduct entirely different campaigns for the various divisions you handle?

A Yes, and that's one of the things that make this a rather busy office. We put together 10 separate advertising budgets. Each involves different products, different markets, different media, and different problems.

Q Are you frequently able to measure the effectiveness of your advertising?

A Only once in a while do we embark on a program in which we deliberately design our advertising to pull replies or active response. And when we do it works. Most of our advertising is designed

use of trade and industrial magazines"

"A product may be seasonable, but the job of keeping a customer and prospect aware of the product is not."

to do the type of job that can be measured only by its contribution to the success of our sales programs. Its effectiveness is hard to measure, but there is no doubt in my mind that our advertising has played a big part in our growth and expansion.

Q How large is your advertising department?

A At the present time we have 14 people.

Q What are your beliefs in regard to continuity in advertising?

A We certainly don't believe in hit-and-run tactics. Our advertising is in every sense a part of our sales efforts. We make every attempt to coordinate our theme and pitch with those being used by our salesmen, and if it is to successfully support their activities our advertising must appear regularly. A product may be seasonable, but the job of keeping a customer and prospect aware of the product is not.

Q What is your feeling regarding the importance of trade and industrial publications?

A Well, several times I have been asked if I thought that people really read trade and industrial magazines and my answer, I think, is rather basic. I feel that any man who is interested in advancement and success must read one or more of the better magazines that cover his chosen field. They are his only means of keeping track of the constantly changing influences within his business. They are his one sure way of learning the news that affects his business or industry while it is still news.

Q How do trade and business publications figure in your present advertising activities?

A They are and, I am sure, will continue to be the backbone of our advertising effort. They provide a very vital link in our lines of communications with our many customers and prospects.

Q Do you feel that the advertisements that appear in trade and industrial magazines are of particular interest or importance to readers?

A I can answer that question best by telling you about a recent discussion I had with one of our engineers. We were discussing reading habits, and he told me quite frankly that most of the time he reads the advertising more closely than the editorial material because in their effort to sell, advertisers tell him in digest form everything that is new in the way of products and services.

Q Is your use of trade and industrial publications increasing?

A The number of publications we use has gone up greatly over the last 10 years, because our sales departments have steadily sought new and broader markets. As I said before, our advertising is closely coordinated with our sales activities, and when our salesmen move into new areas advertising moves along in support.

Q In conclusion, is there anything more that you would like to say about the value of the trade and industrial press as an advertising medium?

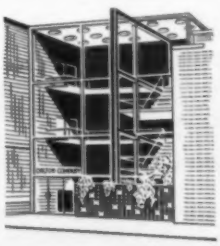
A I would only like to repeat that here at Rockwell we are great believers in the consistent use of trade and industrial magazines. We are convinced that the

". . . when our salesmen move into new areas, advertising goes along in support."

important men—our customers and prospects—in any field read them faithfully. In their desire to keep abreast of changes, they read both editorial and advertising pages closely. This of course does not mean that all our advertisements are seen by everyone for whom they are intended—that is one of the reasons we advertise consistently in all of the publications we use.

Through the use of trade and industrial publications you are able to communicate with your customers and prospective customers in an atmosphere that is natural to them and most productive for you. Today's reliable business press serves a purpose unduplicated by any other selling force.

Chilton publications cover their chosen fields with an editorial excellence and a strict control of circulation that assure confidence on the part of readers and advertisers. With such acceptance goes a proportionate selling power.



Chilton
COMPANY

Chestnut and 56th Streets • Philadelphia 39, Pennsylvania

CHILTON PUBLICATIONS: Department Store Economist • Hardware Age
The Iron Age • Jewelers' Circular-Keystone • Distribution Age • Motor Age
Automotive Industries • Optical Journal and Review of Optometry • Spectator
Commercial Car Journal • Boot and Shoe Recorder • Hardware World
Gas • Electronic Industries • Butane-Propane News • Book Division

ELECTRICAL POWER EQUIPMENT IN STOCK

DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3900	New Elliott	Enc. F.V. d. arm.	475	320
2	3000	New Whse.	Enc. F.V. d. arm.	525	600
1	2250	New Elliott	Enc. F.V. d. arm.	600	200/300
1	2200	G.E.	MCF	600	400/500
1	1750	New Elliott	Enc. F.V. d. arm.	250	175/350
1	1500	Whse.	Enc. F.V. B.B.	525	600
4	1500	Whse.	Enc. F.V.	535	600
1	1375	G.E.	MCF	415	1300
1	1300	G.E.	MCF-12	300	288/400
1	1200	G.E.	MCF	600	450/600
1	1000	Whse.		500	800/2000
1	940	Whse.	QM	250	140/170
2	800	G.E.	MCF	250	400/750
2	750	G.E.	MCF	600	450/900
1	750	G.E.	MCF	600	300/720
1	750	G.E.	MCF	600	120/360
4	600	Whse.		250	275/550
1	500	G.E.	TLF-2656H B.B.	250	2000/3600
1	500	G.E.	MPC-10	250	188/480
3	450	Whse.		550	415
2	400	G.E.	CY-275	300	1000/1500
1	300	Cr.Wh.	H-102 B.B.	230	1200
2	300	G.E.	MCF-6	250	1000/2300
2	300	G.E.	MPC	230	400
2	275	G.E.	TLC-108 B.B.	250	2000/4000
1	250	G.E.	MDF-614AE	425	950
1	225	G.E.	TLC-110 B.B.	250	1150/3600
1	200	Whse.	CB207.4	250	850/1200
1	150	Cr.Wh.	CMC-65H	230	1150
1	150	G.E.	CD. B.B.	600	250/750
1	150	G.E.	TLC-74 B.B.	250	1150/3500
1	120	G.E.	TLC-50 B.B.	250	1950/5000
1	125/150	Whse. New	CB-210.3	230	800/1200
1	120	Rel.	1056T B.B.	230	575/900
2	125	Whse.	SK-190	230	450/1200
1	125	Whse.	SK-185	230	350/1050
1	100	G.E.	CDP-115	230	1750
2	100	Whse.	SK-181	230	450/1000
1	75	G.E., B.B.	CD-1188 D.P.	600	850
6	40	Rel.,B.B.	285F, TEFC	230	500/1500

MERCURY ARC RECTIFIERS

3—150 KW, G.E., Sealed Tube Ignitron Unit Substation load centers 375 V. D.C., 2300 V. A.C. Pyranol filled transformers complete.
2—150 KW, G.E., Ignitron, 245 V. D.C.—220 V. A.C., air cooled transformers with controls.

MG SETS—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1500	G.E.	600	600	2300/4150
2	1000	G.E.	720	600	6600/13200
2	750	G.E.	720	250/300	6600/13200
1	500	Whse.	900	125/250	440
1	500	G.E.	900	125/250	440
1	350	G.E.	900	125	440/2300/4160
1	300	G.E.	1200	250	2300/4000
1	300	G.E.	1240	250	415/2300
1	250	Whse.	1200	250/275	2300
1	200	G.E.	1200	250	440/550
1	200	Whse.	1200	550	2200
1	200	El.Mfg.	1200	250	2300/4600
1	150	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	150	G.E.	1200	125	440
1	140	Cr.Wh.	600	125/250	2300
1	100	G.E.	1170	250	220/440
1	100	Cr.Wh.	1800	240	440
2	100	Cr.Wh.	1160	525	220/550
1	100	G.E. (unused)	1200	250	2400/4160
2	75	Whse.	1200	125	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
3	3333	Whse.	OISC	1	13800 x 2300
1	1500	G.E. auto	HT	3	4000/4200/4400
3	1000	G.E.	HVDDJ	1	2400 x 480
3	1000	G.E.	OA/FA	1	13800 x 230/460
2	750	G.E.	Pyranol	1	4800x85/55-255/165
3	500	Kuhl	OISC	1	13200 x 6600
3	333	G.E.	OISC	1	13200 x 2530/4380Y
3	150	G.E.	OISC	1	33,000x2300/4000Y
3	100	Whse.	SK	1	4600x460/230/115

CRANE & MILL MOTORS

230 V., D.C.

Qu.	H.P.	Make	RPM	Type
14	12/15	Whse.	700/800	MCA-30, Series
1	20	Whse.	975	K-5, Series
2	23	G.E.	650	MD8-408-AE-2 sh.
2	25	G.E.	725	CO-1808, Series
1	35	Whse.	480	CK-9 Comp. S.B.
1	35	Whse.	480	CK-9 Sh. R.B.
1	45	Whse.	800	CK-9 Comp. S.B.
3	50	G.E.	650	COM-1830 Comp.
3	50	Whse.	595	CK-9 Shunt R.B.
2	50	Whse.	800	CK-9 Comp. R.B.
1	50	G.E.	550	MD-412AE 2 Comp. R.B.
1	50	Cr.Wh.	550	SW-50 Comp.
1	100	G.E.	475	CO-1832 Series S.B.
8	100/140	Whse.	500/415	MC-90 Series R.B.
9	125	G.E.	625	CO-1832 Series S.B.

RE-NU-BILT by

BELYEA COMPANY, Inc.

47 Howell St. Jersey City 6, N. J.

Tel. OLdfield 3-3334

Inquiries Pick Up At Chicago

Used machinery dealers report there's more buyer interest in late model, general purpose equipment.

Some orders not filled because supplies are lacking.

▪ Riding on an increased wave of inquiries, midwestern dealers are attempting to add to their stocks of used tools. The problem: There's a good demand for fairly recent equipment but none is available.

Demand is strong and gaining for late model, general purpose used tools. But there's continuing decline in demand for new foreign tools, high precision equipment, and special purpose, heavy production machine tools.

Imports Less Popular—For instance, a dealer who last year did 66 pct of his business in new imported equipment and the remainder in used domestic machine tools, now does only 25 pct of his business in foreign tools and 75 pct in used domestic tools.

Inquiries for all types of equipment are high, but actual sales are being made in toolroom equipment of fairly late vintage.

Heavier demand for this grade has actually pushed up prices in a number of cases, despite fact that prices for more specialized equipment are dropping.

Small Shops Buying—Fabricating equipment sales have improved, following a slump in late 1957. Large punch presses and light press equipment have been showing gains since January. In the past month demand for this equipment has been even stronger.

It's now positive that a substantial portion of the new business is coming from small job shops or smaller metalworking firms. They are buying lighter, general purpose equipment. Though they are keenly conscious of price, they aren't interested in very old equipment which has the lowest price of all.

March Sales Gain—Dealer stocks in the Chicago area seem fairly strong, despite the limiting of demand to tools of a particular age. Most dealers report they are well satisfied with their own floor stocks. However, all will admit they've had to turn some business away in the past two weeks simply because they were unable to find the tool wanted.

There are several possible reasons why these sales were not concluded. Buyers may have insisted on rapid delivery. They also might have been shopping for bargain-counter prices.

Some Cheerful, Some Not—The sales level is currently good. Forecasters are about equally divided between pessimism and optimism. Nearly all agree, however, that March sales are showing gains over February, sometimes by as much as 15 pct. And nearly all agree that March is turning into the best sales month so far this year. The improvement is not in imported tools, older tools, or specialized tools; but in general purpose tools. And most dealers are geared for the trend.

Why the pessimism, then? The dealers who see trouble ahead seem to be quoting from what they hear. The level of their own business usually isn't bad and often is improving.

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5 ton	Shepard Niles	70' Span 230 Volt D.C.
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10 ton	Shepard Niles	38' Span 440/3/60
10 ton	Shaw	48' Span 230 Volt D.C.
10 ton	Shaw	120' Span 230 Volt D.C.
15 ton	Shepard Niles	58' Span 230 Volt D.C.
20 ton	Shaw	28' Span 230 Volt D.C.
50 ton	Northern	52' Span 440/3/25 A.C.
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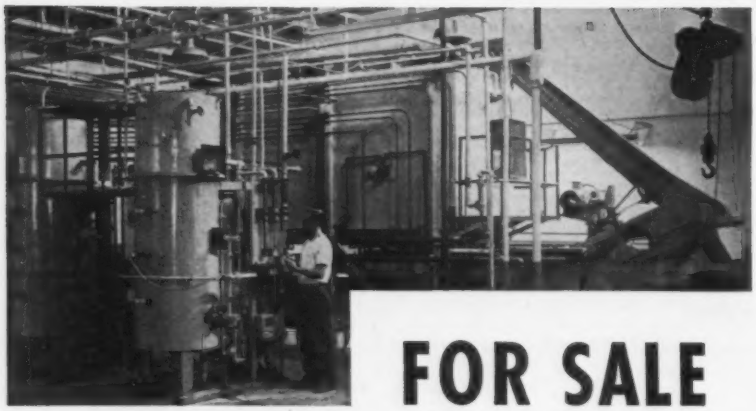

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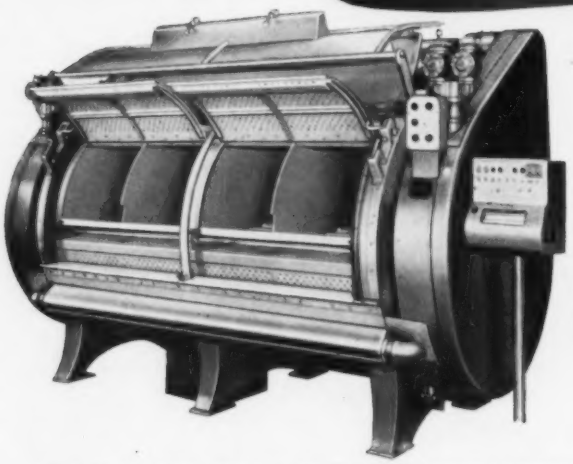

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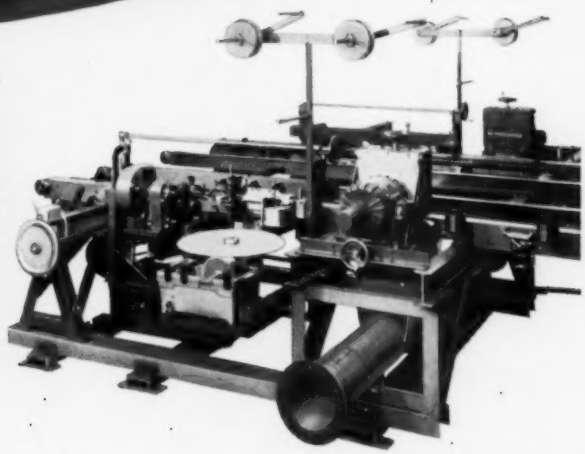

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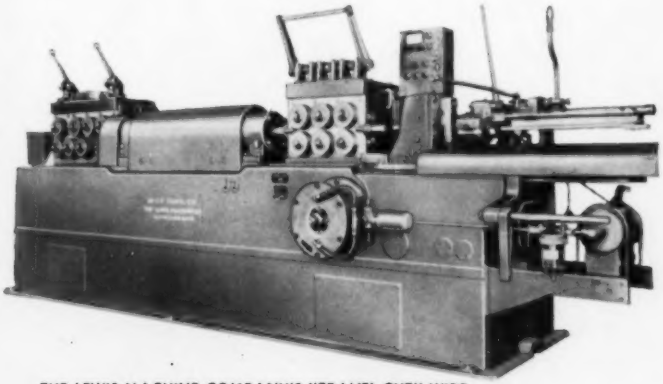

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